I BLOCCHI:
OLTRE IL FUTURO

Giuseppe Pascarella

Area di Anestesia, Rianimazione e Terapia del Dolore

Policlinico Universitario Campus Biomedico di Roma

Verso la Chirurgia Ortopedica Ambulatoriale -

International Meeting Orthopea, *Milano,* 7 Giugno 2019

DISCLOSURE

	No, nothing to disclose
	~~Yes, please specify:~~

Company Name	*Honoraria/ Expenses*	*Consulting/ Advisory Board*	*Funded Research*	*Royalties/ Patent*	*Stock Options*	*Ownership/ Equity Position*	*Employee*	*Other (please specify)*

DOVE NASCE IL FUTURO DELL'ALR ?

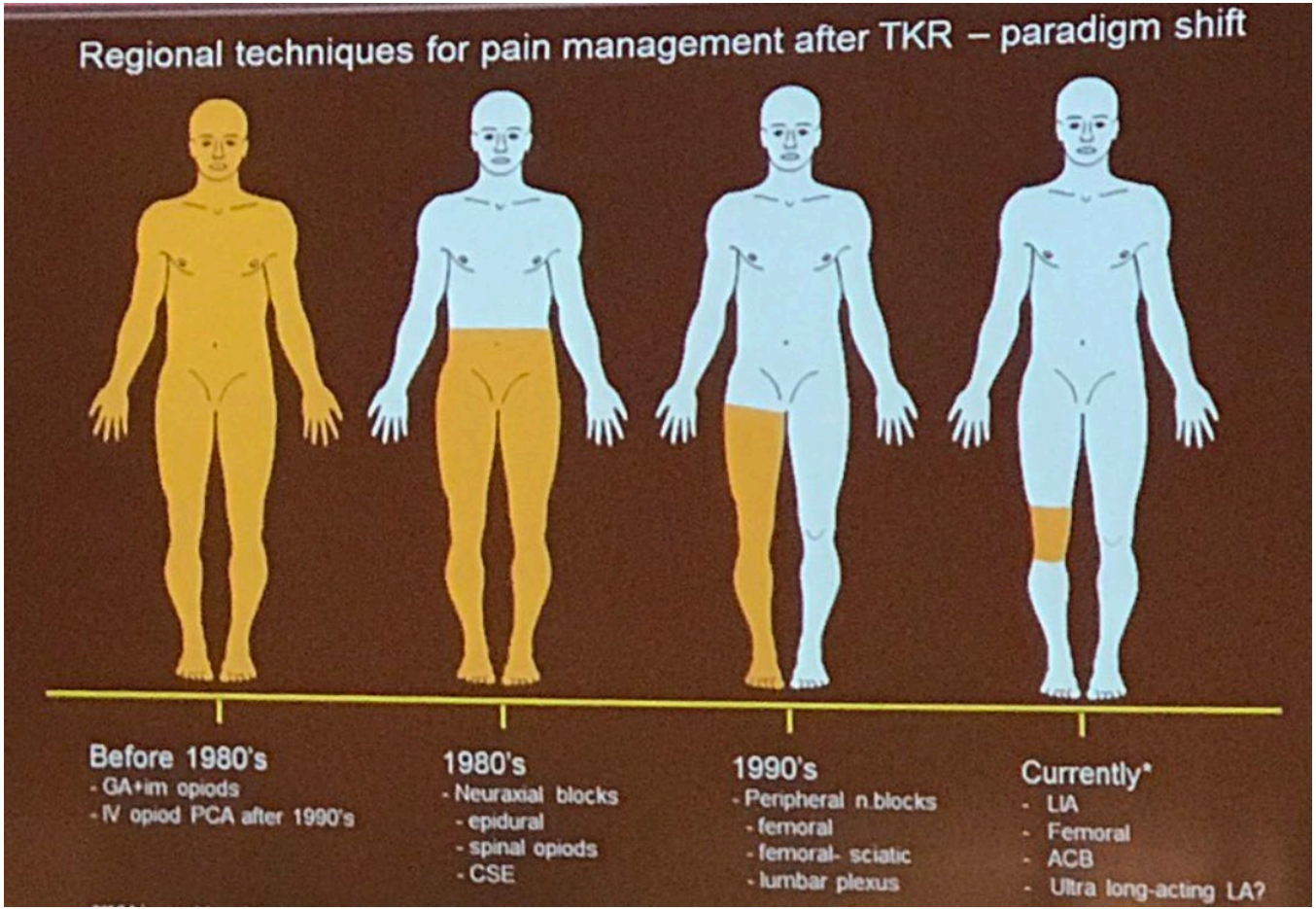
Fast Track Surgery

Tecniche di anestesia Locoregionale che assicurino analgesia postoperatoria e recupero precoce dal blocco motorio

- ↓ Tempi di inizio fisioterapia attiva e deambulazione
- ↓ Tempi di degenza
- ↓ Tasso di complicanze tromboemboliche
- ↓ Costi

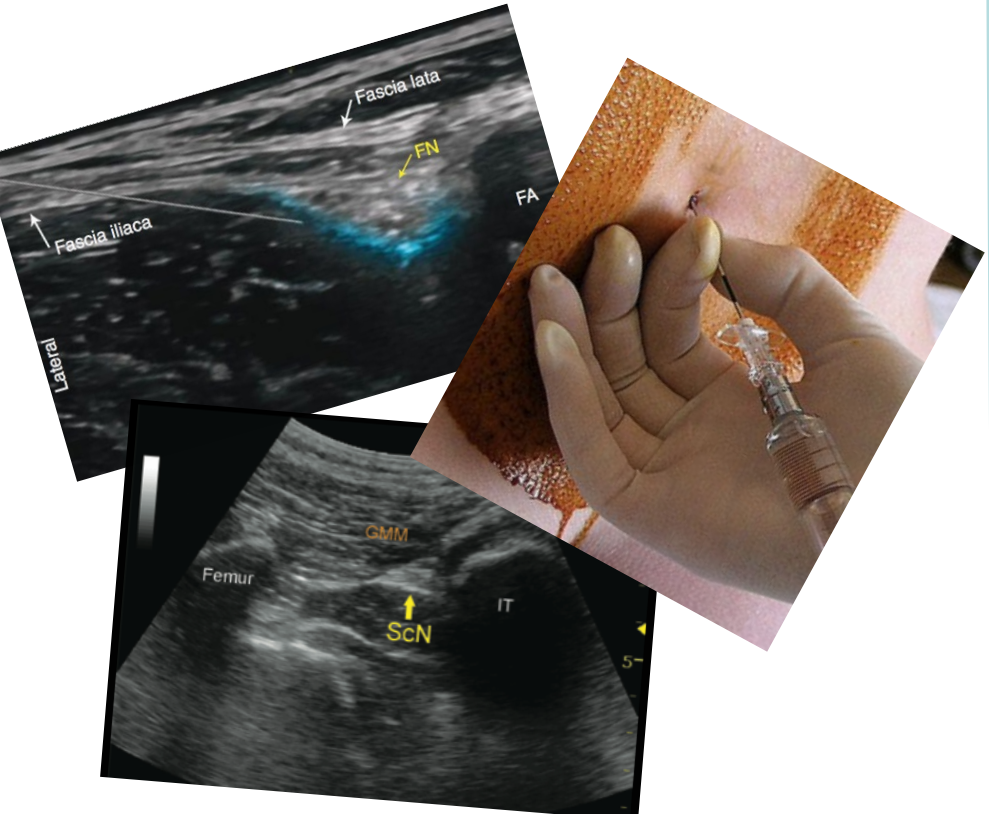
Patient walking with walker and crutches immediately after surgery

CONOSCERE IL PASSATO PER COMPREDERE MEGLIO IL FUTURO…

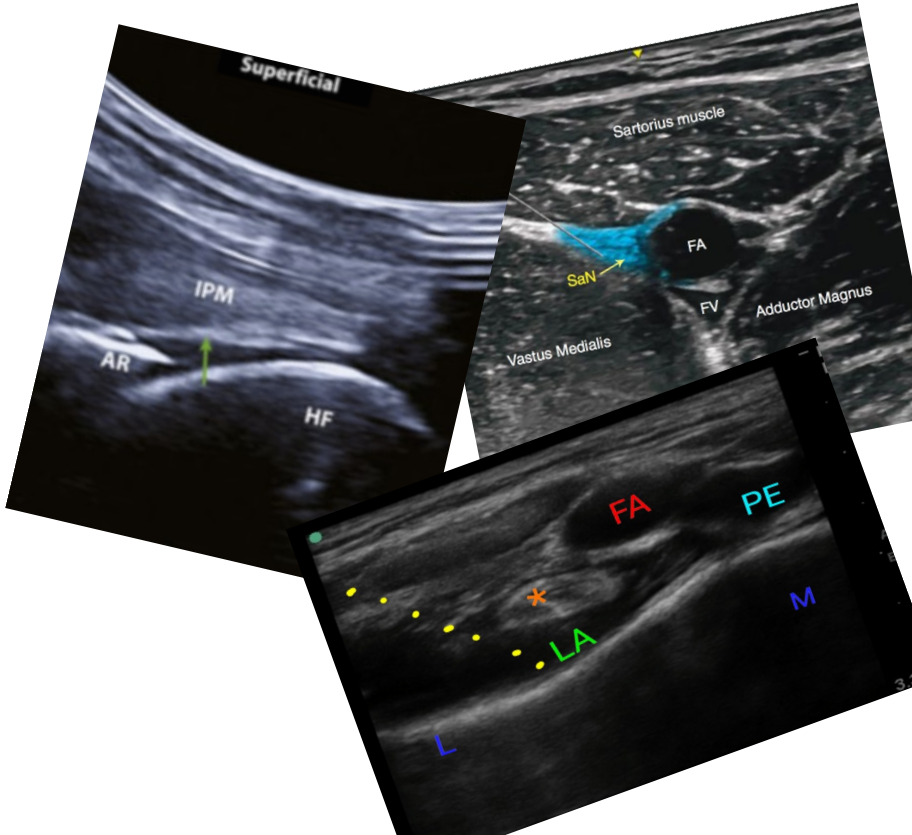


#10YEARSCHALLENGE

2009 NERVE BLOCKS



PLANE BLOCKS 2019

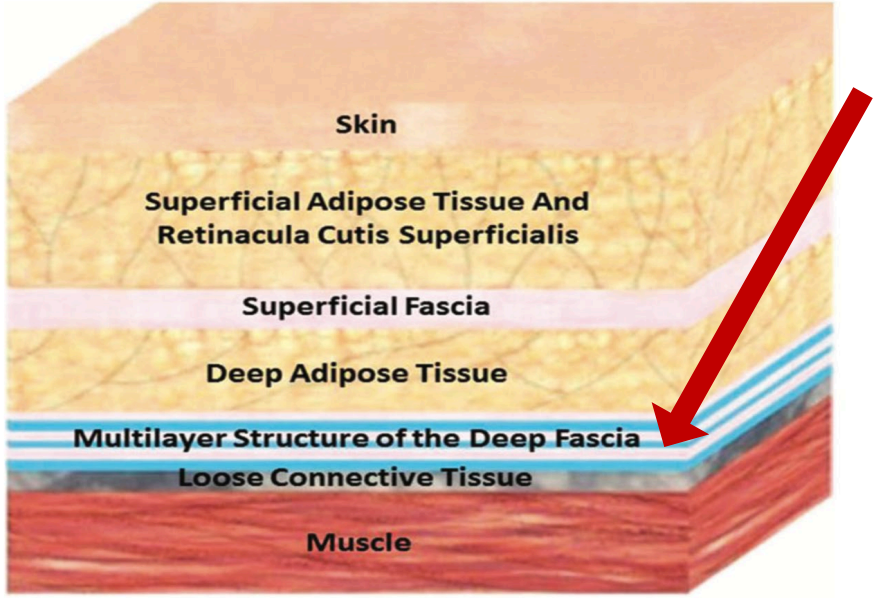


Regional Anesthesia and Pain Medicine • Volume 43, Number 4, May 2018

Interfascial Plane Blocks
Back to Basics

Hesham Elsharkawy, MD, MBA, MSc, Amit Pawa, MBBS(Hons), FRCA,†‡ and Edward R. Mariano, MD, MAS§*

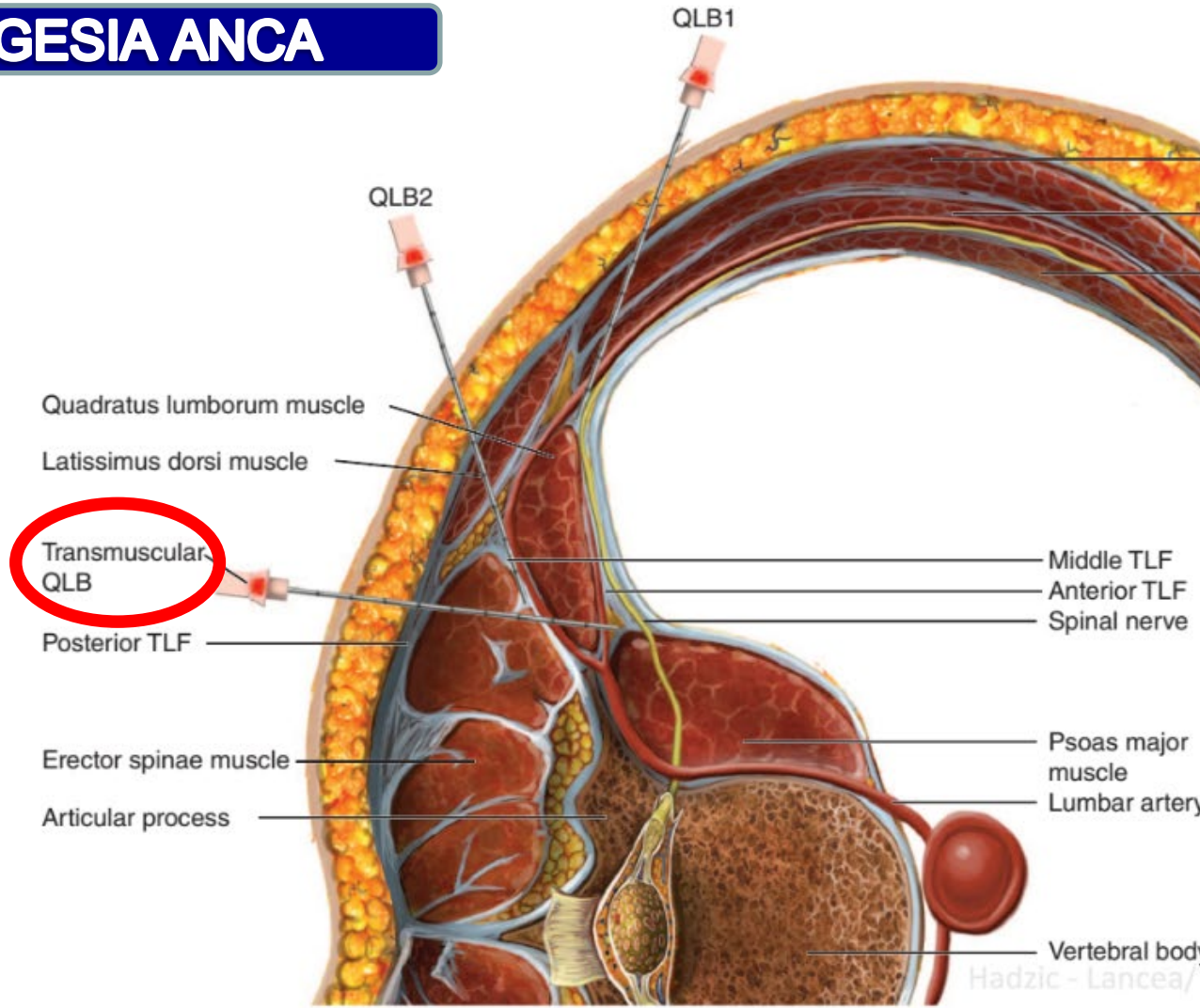
- Possibilità di avere blocco selettivo sensitivo
- Maggiore durata del blocco
- ↓ L'esigenza di posizionamento cateteri peridurali/perineurali e gestione in reparto.
- Devono essere sempre associati ad un protocollo solido di analgesia multimodale




BACK TO THE FUTURE
TECNICHE
DISPOSITIVI
FARMACI
OUTATIME

TECNICHE – ANALGESIA ANCA

QUADRATUS LUMBORUM BLOCK



Br J Anaesth. 2016 Sep;117(3):387-94. doi: 10.1093/bja/aew224.

A cadaver study comparing spread of dye and nerve involvement after three different quadratus lumborum blocks.

Carline L[1], McLeod GA[2], Lamb C[1].

T3 transverse process. All transmuscular QL blocks (Fig 4) spread consistently to L1 and L3 nerve roots and also within psoas and quadratus lumborum. A summary of block characteristics is

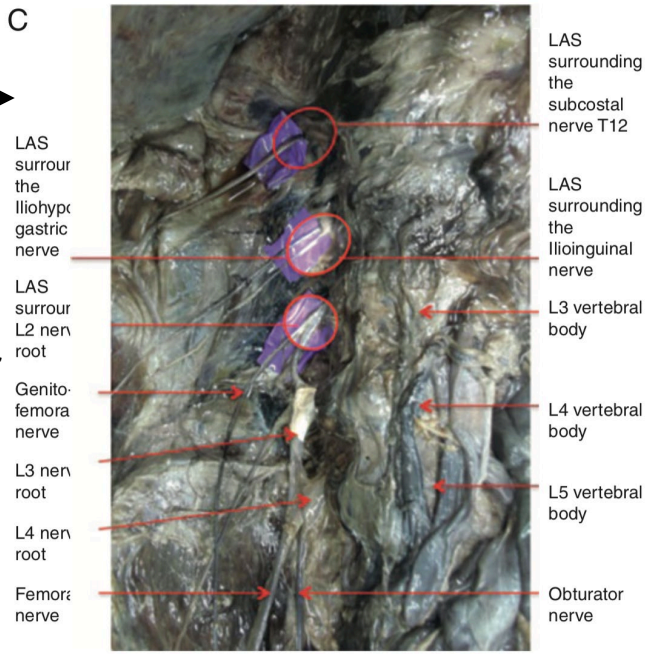
Anesth Analg. 2017 Jul;125(1):303-312. doi: 10.1213/ANE.0000000000001922.

The Pathway of Injectate Spread With the Transmuscular Quadratus Lumborum Block: A Cadaver Study.

Dam M[1], Moriggl B, Hansen CK, Hoermann R, Bendtsen TF, Børglum J.

RESULTS:

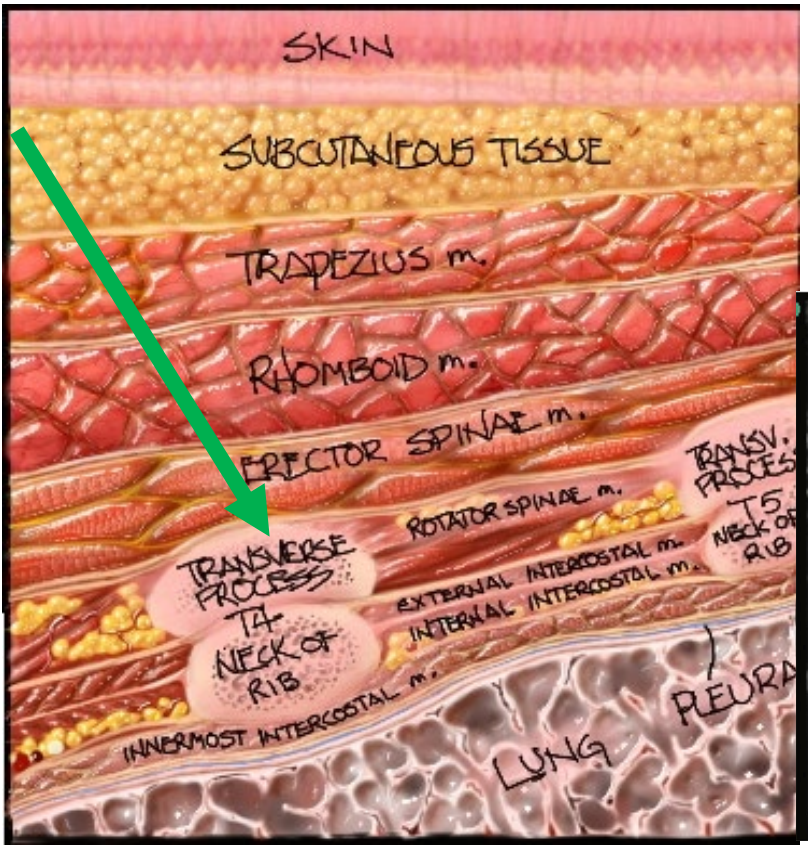
Caudad to the diaphragm, the injected dye surrounded the subcostal, iliohypogastric, and ilioinguinal nerves in all cases, whereas the genitofemoral and lateral femoral cutaneous nerves were dyed in a varying degree. No dye was seen to surround the lumbar plexus, femoral nerve, or lumbar sympathetic trunk. The pattern of spread was similar with the TQL and TOP TQL injections.



QUADRATUS LUMBORUM BLOCK(QLB)

TITLE	GROUP	YEAR	ANESTHESIA	SURGERY	POPULATION	
Quadratus Lumborum Block as an Alternative to Lumbar Plexus Block for Hip Surgery: A Report of 2 Cases	La Colla, Luca MD; Ben-David, Bruce MD; Merman, Rita MD	2017	QL1+GA(+SACRAL NEUROSTIMULATOR); QL1+SA	internal fixation; hip revision	2	
Continuous quadratus lumborum type 3 block provides effective postoperative analgesia for hip surgery	Yayik AM, Cesur S, Ozturk F, Ahiskalioglu A, Celik EC.	2018	QL3	THA	2	
Extravasated Fluid in Hip Arthroscopy and Pain: Is Quadratus LumborumBlock the Answer?	Ben-David B, La Colla L.	2017	QL (not specified)	nd	nd	
Single-shot Quadratus Lumborum Block for Postoperative Analgesia After Minimally Invasive Hip Arthroplasty: A New Alternative to Continuous Lumbar Plexus Block?	La Colla, Luca MD; Uskova, Anna MD; Ben-David, Bruce MD	2017	QL1+SA	THA	1	
The ultrasound-guided continuous transmuscular quadratus lumborum block is an effective analgesia for total hip arthroplasty	HironobuUeshimaMD, PhD, SakatoshiYoshiyamaMD,HiroshiOtakeMD, PhD	2016	cont TQL+GA	THA	2	
Continuous Quadratus Lumborum Block for Postoperative Pain in Total Hip Arthroplasty: A Case Report	Hockett, Margaret M. MD; Hembrador, Sheena MD; Lee, Alex MD	2016	cont QL1+GA	THA	1	
Continuous quadratus lumborum block analgesia for total hip arthroplasty revision.	Johnston DF, Sondekoppam RV	2016	cont TQL+GA	HA revision	1	
Transmuscular quadratus lumborum versus lumbar plexus block for total hip arthroplasty: A retrospective propensity score matched cohort study	Sanjib D. Adhikary, Anthony J. Short,1 Kariem El-Boghdadly,2 Mena J. Abdelmalak,3 and Ki Jinn Chin4	2018	US-guided TQL vs NS-guided LPB; then GA	THA	30 vs 30	comparable analgesic results
Quadratus lumborum block provides improved immediate postoperative analgesia and decreased opioid use compared with a multimodal pain regimen following hiparthroscopy.	Christopher L McCrum,1 Bruce Ben-David,2 Jason J Shin,3 and Vonda J Wright4	2018	QL1	H arthroscopy	28 vs 28 (retrospective)	less pain in QL1 group
Effects and safety of quadratus lumborum block in analgesia after hip arthroplasty (article in chinese)	He J1, Zheng XQ, Luo CH, Huang ZX, He WY, Wang HB, Yang CX.	2018	QL ? Vs no QL	THA	30 vs 30	less pain in QL group
Clinical experiences of the continuous quadratus lumborum block via paramedian sagittal oblique approach	Ohgoshi Y1, Nakayama H2, Kubo EN2, Izawa H3, Kori S2, Matsukawa M2.	2017	paramedian sagittal oblique QL	THA	2	
Combination of lumbar erector spinae plane block and transmuscular quadratus lumborum block for surgical anaesthesia in hemiarthroplasty for femoral neck fracture	Serkan Tulgar, Mehmet Nurullah Ermis,1 and Zeliha Ozer	2018	ESP+TQL+deep sedation (fentanyl/ketamine)	hemiarthroplasty	1	

ERECTOR SPINAE BLOCK (ESP)

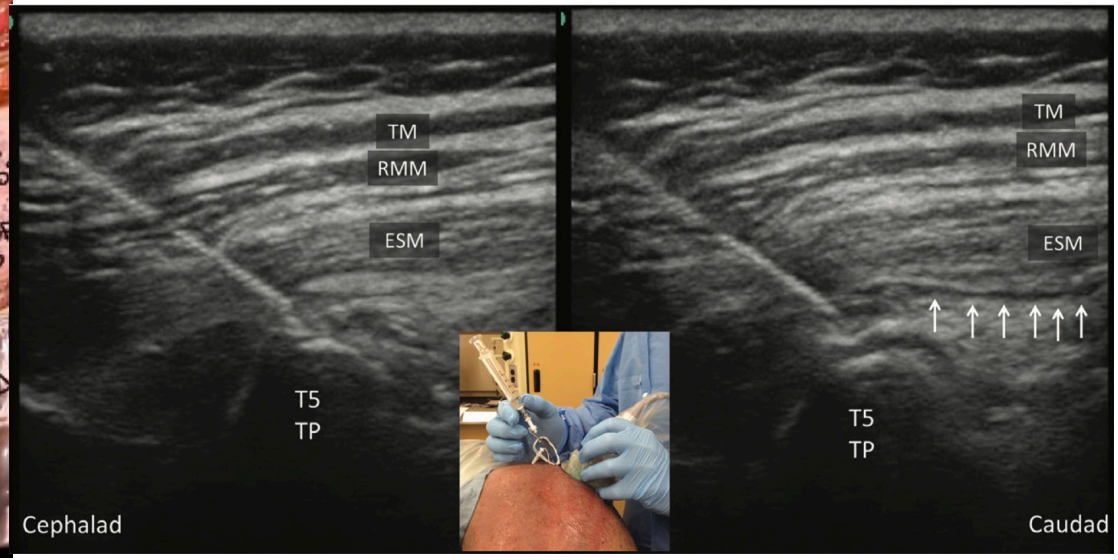


The Erector Spinae Plane Block

A Novel Analgesic Technique in Thoracic Neuropathic Pain

Mauricio Forero, MD, FIPP, Sanjib D. Adhikary, MD,† Hector Lopez, MD,‡ Calvin Tsui, BMSc,§ and Ki Jinn Chin, MBBS (Hons), MMed, FRCPC||*

Regional Anesthesia and Pain Medicine • Volume 41, Number 5, September-October 2016



ERECTOR SPINAE BLOCK (ESP)

Reg Anesth Pain Med January 2019 Vol 44 No 1

Spread of local anesthetic in erector spine plane block at thoracic and lumbar levels

Serkan Tulgar,[1] Onur Balaban[2]

[1]Faculty of Medicine, Department of Anesthesiology and Reanimation, Maltepe University, Istanbul, Turkey
[2]Faculty of Medicine, Department of Anesthesiology and Reanimation, Kütahya Dumlupinar University, Kütahya, Turkey

In our observation, ESPB performed at thoracic vertebrae level has a clinical effect similar to an extended paravertebral block; meanwhile lumbar ESPB clinically acts as a lumbar plexus block. Local anesthetic solution

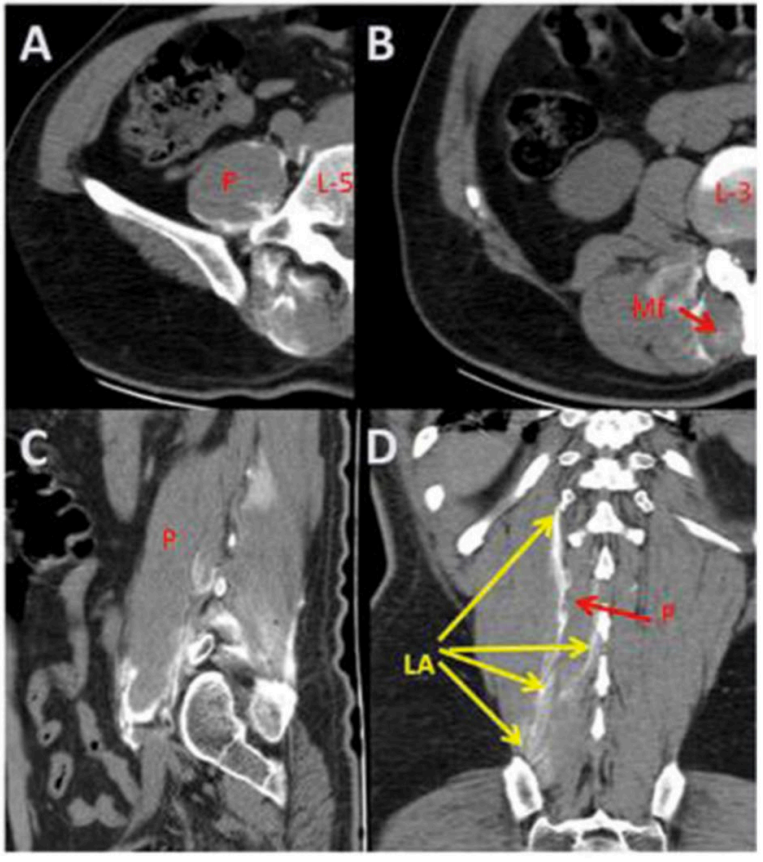


Figure 1 (A) Axial image at L-5 level. (B) Axial image at L-3 level. (C) Sagittal image of lumbar area. (D) Transverse image of thoracolumbar area. L-5: fifth lumbar vertebral body, I-3: third vertebral body, P: psoas muscle, MF: multifidus muscle, LA: local anesthetic.

ERECTOR SPINAE (ESP)

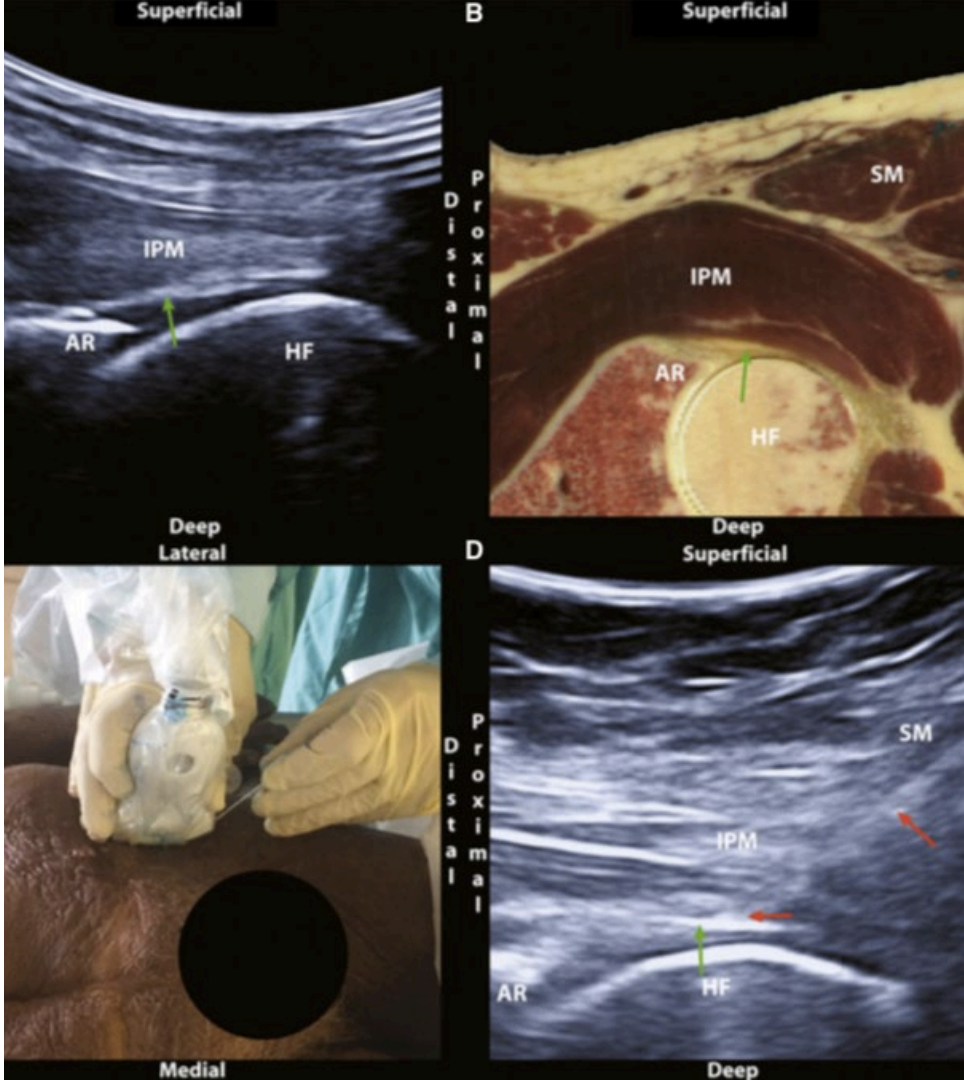
TITLE	GROUP	YEAR	ANESTHESIA	SURGERY	POPULATION
Ultrasound guided Erector Spinae Plane block at L-4 transverse process level provides effective postoperative analgesia for total hip arthroplasty.	Tulgar S, Senturk O.	J Clin Anesth. 2018	GA+ESP L4	THA	1
Successful directional thoracic erector spinae plane block after failed lumbar plexus block in hip joint and proximal femur surgery.	Darling CE, Pun SY, Caruso TJ, Tsui BCH.	J Clin Anesth. 2018 Sep	GA+ESP L4	hip dislasia 11-y-old	1
Erector spinae plane block for pediatric hip surgery	Elkoundi A, Bentalha A, Kettani SEE, Mosadik A, Koraichi AE.	Korean J Anesthesiol. 2018	ESP	hip displasia 4-y-old	1
Clinical experiences of ultrasound-guided lumbar erector spinae plane block for hip joint and proximal femur surgeries.	Tulgar S, Selvi O, Senturk O, Ermis MN, Cubuk R, Ozer Z.	J Clin Anesth. 2018	ESP L4	HIP+PROXIMAL FEMUR	12
Continuous Erector Spinae Block at lumbar level (L4) for prolonged postoperative analgesia after hip surgery.	Bugada D, Zarcone AG, Manini M, Lorini LF.	J Clin Anesth. 2019	continuous ESP	HIP	2
Combination of lumbar erector spinae plane block and transmuscular quadratus lumborum block for surgical anaesthesia in hemiarthroplasty for femoral neck fracture.	Tulgar S, Ermis MN, Ozer Z.	Indian J Anaesth. 2018	QL3 + ESP	hemiarthroplasty	1

ILEPSOAS FASCIA

SPREAD OF INJECTATE AROUND HIP ARTICULAR SENSORY BRANCHES OF THE FEMORAL NERVE IN CADAVERS.

NIELSEN ND1,2,3, GREHER M4, MORIGGL B5, HOERMANN R5, NIELSEN TD3, BØRGLUM J6, BENDTSEN TF2,3.

ACTA ANAESTHESIOL SCAND. 2018, AUG.



PENG BLOCK

REGIONAL ANESTHESIA AND ACUTE PAIN

BRIEF TECHNICAL REPORT

Pericapsular Nerve Group (PENG) Block for Hip Fracture

Laura Girón-Arango, MD,† Philip W.H. Peng, MBBS, FRCPC, Founder (Pain Med),*†*
Ki Jinn Chin, MBBS, MMed, FANZCA, FAMS, FRCPC,†*
Richard Brull, MD, FRCPC, and Anahi Perlas, MD, FRCPC*†*

LETTER TO THE EDITOR

PENG block: points to ponder

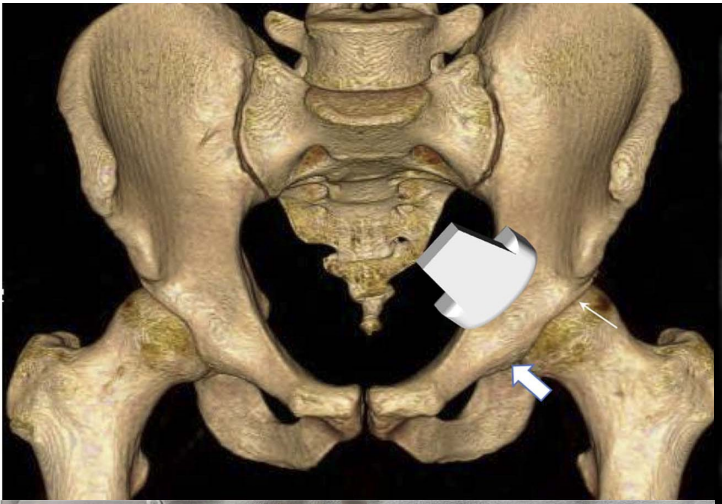
Is pericapsular nerve group (PENG) block a true pericapsular block?

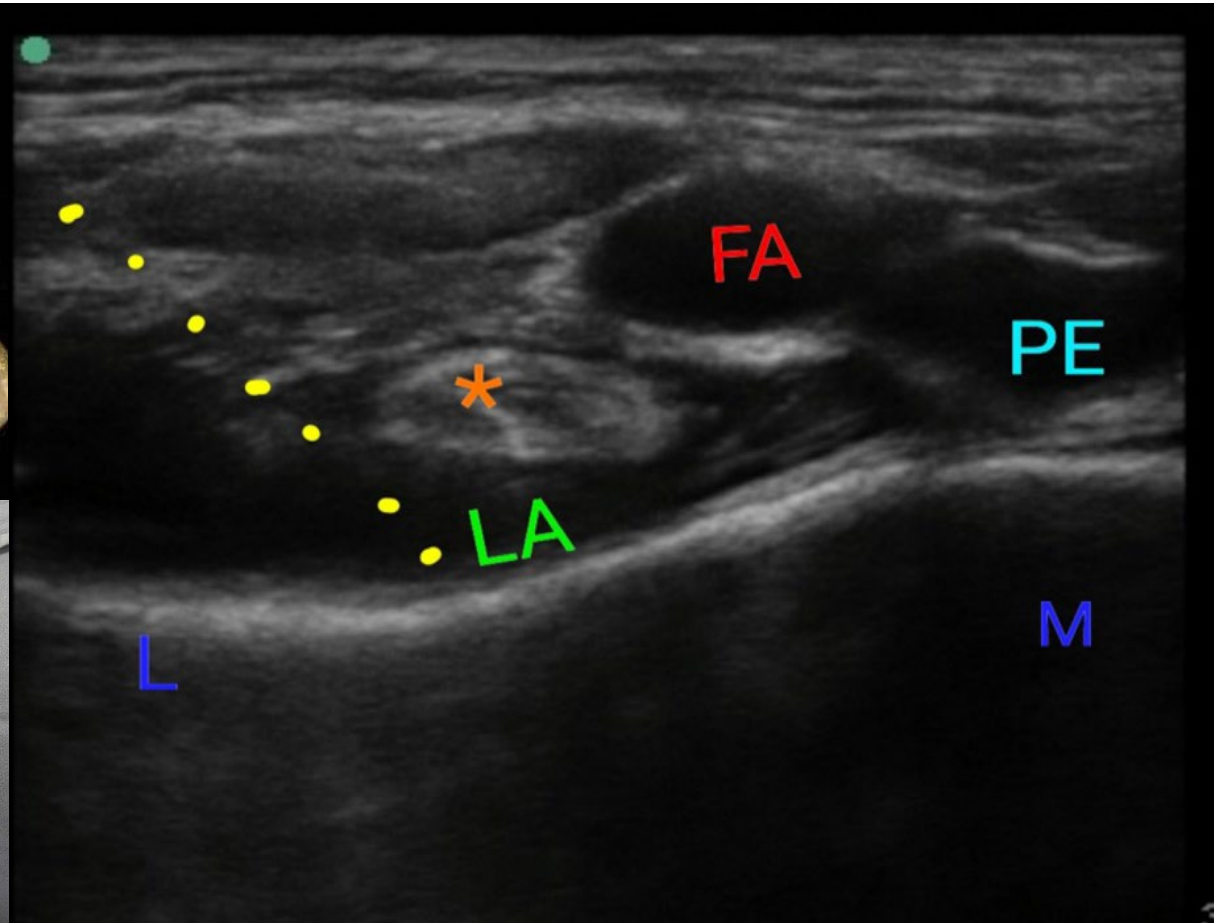
John Tran[1], Anne Agur[1] and Philip Peng[2]

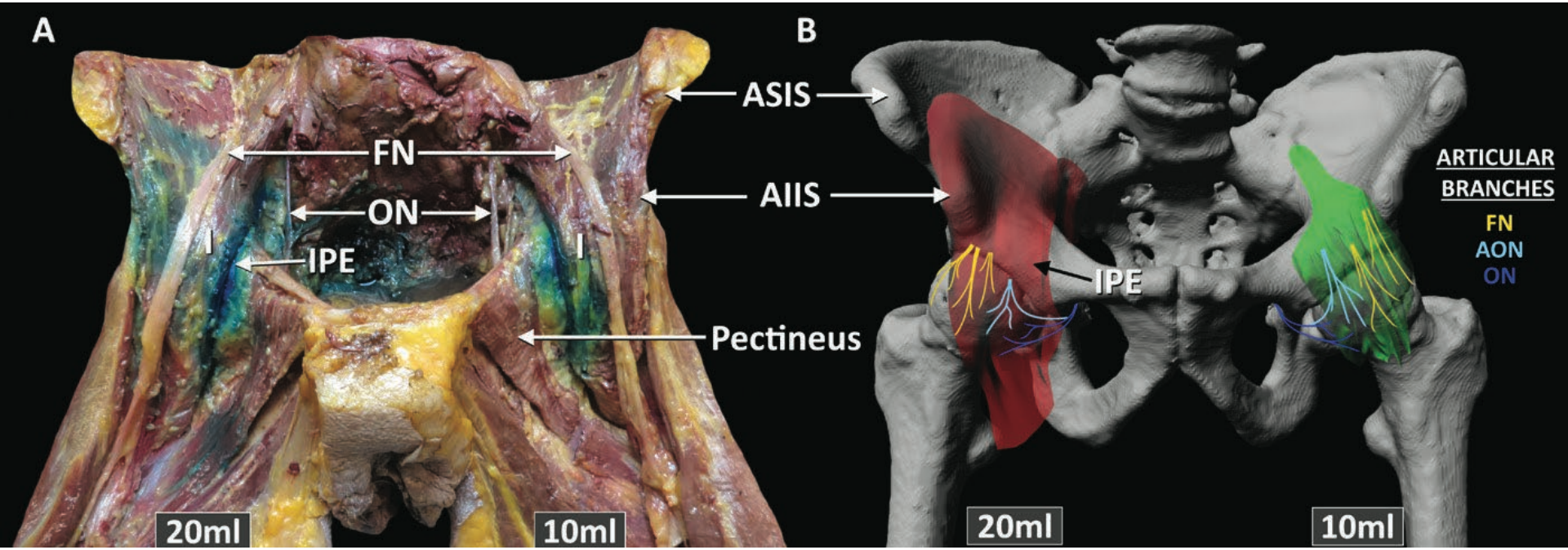
[CITAZIONE] Pericapsular nerve group (PENG) block is effective for dislocation of the hip joint.
H Ueshima, H Otake - Journal of clinical anesthesia, 2018 - ncbi.nlm.nih.gov

[CITAZIONE] Clinical experiences of pericapsular nerve group (P
surgery.
H Ueshima, H Otake - Journal of clinical anesthesia, 2018 - europepmc.org

PENG BLOCK






A
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PENG BLOCK

GINOCCHIO - ANALGESIA COMPARTIMENTO ANTERIORE

Adductor Canal Block

1° PUBLICATION

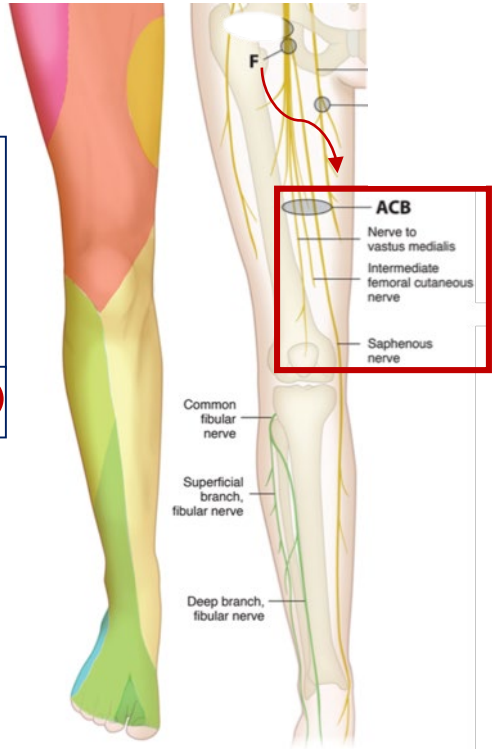
Feasibility and Efficacy of Ultrasound-Guided Block of the Saphenous Nerve in the Adductor Canal

Baskar Manickam, MD, FRCA, Anahi Perlas, MD, FRCPC,† Edel Duggan, MB, FCARCSI,* Richard Brull, MD, FRCPC,† Vincent W.S. Chan, MD, FRCPC,† and Reva Ramlogan, MBBS**

Regional Anesthesia and Pain Medicine • Volume 34, Number 6, November-December 2009

STATE OF THE ART

- Total articles: 233
- Case reports: 10
- RCTs: 59
- Systematic Reviews and Metanalysis: 19
- Letters: 31



Reference	Methods	Participants/ Hips	Intervention (Total) [Mean Age ± SD]	Comparison(s) (Total) [Mean Age] FNB	Anesthetics Used	Outcomes	Key Results
Jaeger, 2013	RCT; Denmark	48 patients; 48 knees	ACB (n = 22) [70 ± 8.0]	FNB (n = 26) [66 ± 9.0]	30 mL of ropivacaine 0.5% followed by a 0.2% ropivacaine at a rate of 8 mL/h for the next 24 h	Quadriceps strength, adductor muscle strength, pain, opioid consumption, adverse events	Quadriceps strength was significantly higher for patients receiving ACB (52% of baseline) in comparison to FNB (18% of baseline) ($P = 0.004$) No significant difference in pain between ACB and FNB ($P = 0.16$)
Kim, 2014	RCT; USA	93 patients; 93 knees	ACB (n = 46) [68 ± 9.4]	FNB (n = 47) [67.6 ± 11.3]	ACB—15 mL of 0.5% of bupivacaine with 5 μg/mL epinephrine FNB—30 mL of 0.25% of bupivacaine with 5 μg/mL epinephrine	Quadriceps strength, pain, opioid consumption, adverse events	No statistical difference in pain between ACB and FNB at 6–8 h ($P = 0.0190$), 24 h ($P = 0.0103$), or 48 h ($P = 0.005$) Quadriceps strength was significantly higher in the ACB group at 6–8 h ($P < 0.0001$) ACB did not have significantly higher quadriceps strength at 24 or 48 h ($P = 0.99$)
Shah, 2014	RCT; India	98 patients; 98 knees	ACB (n = 48) [68.31 ± 7.56]	FNB (n = 50) [65.94 ± 7.22]	30 mL injection of ropivacaine 0.75% followed by repeated injections of ropivacaine 0.25%, 30 mL at an interval of 4 h until 8:00 A.M. on the morning of the second day after surgery	Pain, ambulation time, mobility	ACB displayed significantly better postoperative outcomes in comparison to FNB for time to ambulation (TUG, 10 min and 30 s) and early functional recovery ($P < 0.001$) No significant difference in pain between the 2 groups at 4, 8, 24, or 48 h follow-up ($P < 0.05$)
Grevstad, 2014	RCT, Denmark	50 patients; 50 knees	ACB (n = 25)	FNB (n = 25)	30 mL ropivacaine 0.2%	Quadriceps strength, pain, mobility	Quadriceps strength was significantly higher in the ACB group at 2 h follow-up ($P < 0.0001$) Postoperative pain did not significantly differ between the 2 groups at all follow-up times ($P > 0.05$) Before block, 2 of 25 patients in each group were unable to perform TUG, after block this number increased to 7 in the FNB group and decreased to 0 in the ACB group
Memtsoudis, 2014	RCT, USA	59 patients; 118 knees	ACB (n = 30; left ACB, right FCB)	FCB (n = 29; left FCB, right ACB)	ACB—15 mL bupivacaine 0.25% FNB—30 mL of bupivacaine 0.25%	Quadriceps strength, pain, patient satisfaction	Quadriceps strength was not significantly different between the 2 groups at 6–8, 24, and 48 h follow-up ($P > 0.05$) Pain at rest was not significantly different between the 2 groups at 6–8, 24, and 48 h follow-up ($P > 0.05$)

(Hussain et al. , Anesthesiology, 2016)

Dove inizia il canale degli adduttori?

Reg Anesth Pain Med. 2016 Nov/Dec;41(6):711-719.

The Optimal Analgesic Block for Total Knee Arthroplasty.

Bendtsen TF[1], Moriggl B, Chan V, Børglum J.

Adduttore Lungo

Sartorio

Spina Iliaca Antero-superiore (ASIS)

Inizio del triangolo femorale (TF)

Fine del TF (punto di mezzo tra ASIS e BP)

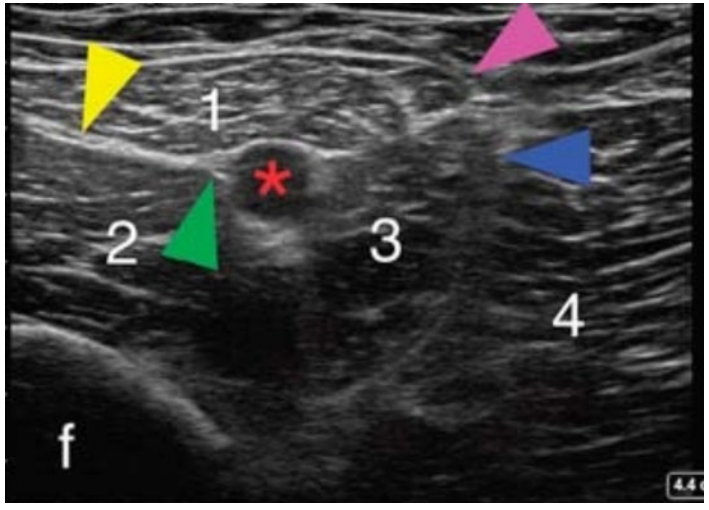
Apice del TF (Inizio del **Canale degli adduttori**)

Fine del Canale degli adduttori

Base della Patella (BP)

ANALGESIA COMPARTIMENTO ANTERIORE

Femoral Triangle Block



NERVO SAFENO

NERVO AL VASTO MEDIALE

1: Sartorio; 2: Vasto mediale;
3: Adduttore Lungo; 4: Adduttore Magno

Reg Anesth Pain Med. 2016 Nov/Dec;41(6):711-719.

The Optimal Analgesic Block for Total Knee Arthroplasty.

Bendtsen TF[1], Moriggl B, Chan V, Børglum J.

Reg Anesth Pain Med. 2014 Sep-Oct;39(5):442-3. doi: 10.1097/AAP.0000000000000119.

Redefining the adductor canal block.

Bendtsen TF[1], Moriggl B, Chan V, Pedersen EM, Børglum J.

An FT (syn: Scarpa triangle) block is a subsartorial injection anterolateral to the FA proximal to the apex of the FT (Figs. 1, 2C, 5A), which blocks the saphenous nerve, the nerve to the vastus medialis muscle, and the medial femoral cutaneous nerve. These

of the FT (Fig. 2D). This might be clinically highly relevant, because local anesthetic injected into the FT may conceivably result in a different analgesic effect from that injected into the AC proper after TKA.

ANALGESIA COMPARTIMENTO ANTERIORE

Reg Anesth Pain Med. 2016 Nov/Dec;41(6):711-719.

The Optimal Analgesic Block for Total Knee Arthroplasty.

Bendtsen TF[1], Moriggl B, Chan V, Børglum J.

Femoral Triangle vs Adductor Canal Block

Femoral Triangle	Adductor Canal Block
✓ Saphenous Nerve	✓ Saphenous Nerve
✓ Medial femoral cutaneous nerve	✓ Medial femoral cutaneous nerve
✓ Nerve to Vastus Medialis	✗ Nerve to Vastus Medialis
✗ Anterior femoral cutaneous nerves	✗ Anterior femoral cutaneous nerves

NON ESISTONO ANCORA TRIAL CLINICI CHE PARAGONINO LE DUE TECNICHE

ANALGESIA COMPARTIMENTO POSTERIORE

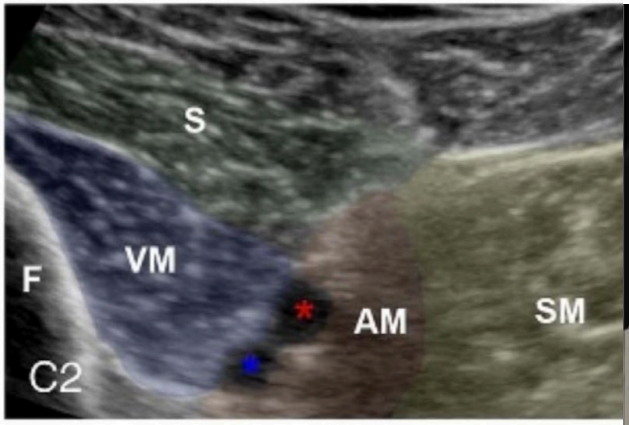
Distal Adductor Canal Block (popliteal plexus)

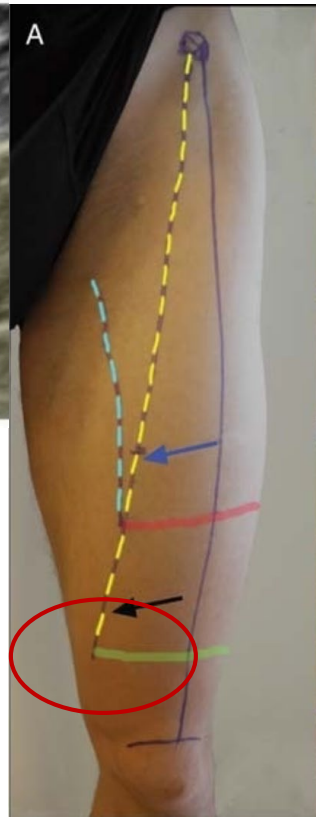
Defining the Location of the Adductor Canal Using Ultrasound

Wan Yi Wong, MMed, MBBS, Siska Bjørn, MS,† Jennie Maria Christin Strid, MD,† Jens Børglum, MD, PhD,‡ and Thomas Fichtner Bendtsen, MD, PhD†*

Regional Anesthesia and Pain Medicine • Volume 42, Number 2, March-April 2017

important contributor to knee innervation. In addition, an injection of a small volume of local anesthetic into the distal part of the true AC can be speculated to spread into the popliteal fossa and anesthetize the posterior branch of the obturator nerve and the popliteal plexus, which provide intra-articular innervation of the knee.[4] An injection of a large volume of local anesthetic into





Acta Anaesthesiol Scand. 2018 May 24. doi: 10.1111/aas.13145. [Epub ahead of print]

The analgesic effect of a popliteal plexus blockade after total knee arthroplasty: A feasibility study.

Runge C[1], Bjørn S[2], Jensen JM[3], Nielsen ND[1], Vase M[1], Holm C[1], Bendtsen TF[3].

RESULTS: Ten subjects with a median pain of NRS 5.5 (interquartile range [IQR] 4-8) after unilateral TKA received a PPB. All 10 subjects experienced a reduction in pain to NRS 3 or below (NRS 1.5 [IQR 0-3]) within a mean time of 8.5 (95% CI 6.8-10.2) minutes. Three subjects were completely pain free after the PPB. The ankle muscle strength was not affected.

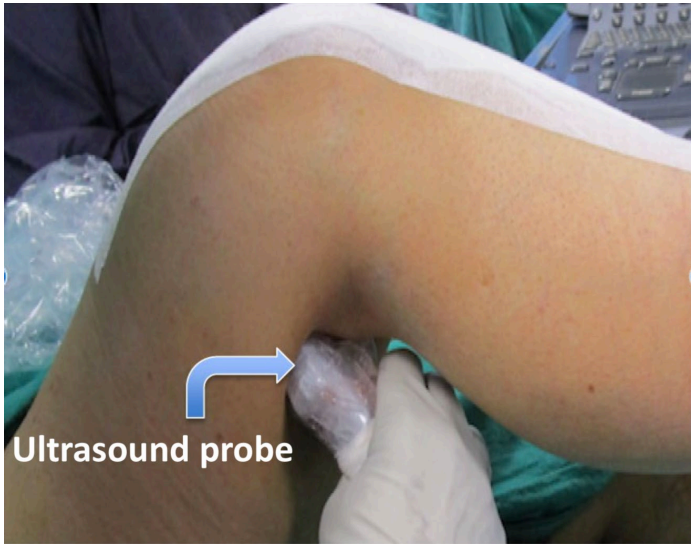
CONCLUSIONS: The PPB provided effective pain relief without affecting the ankle muscle strength in all 10 subjects with significant pain after TKA and an FTB.

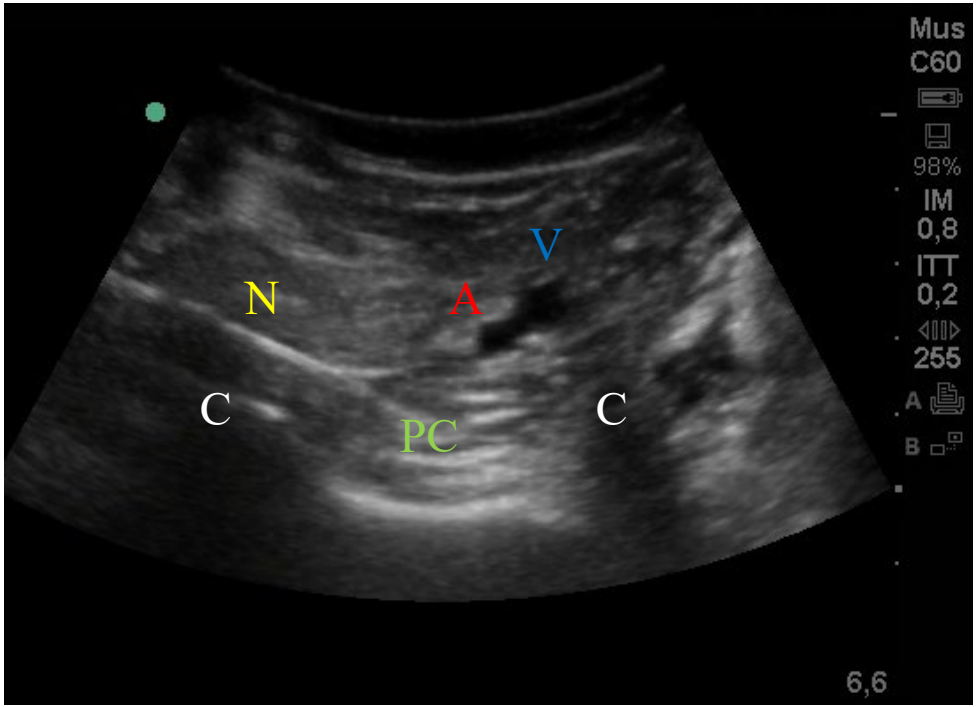
ANALGESIA COMPARTIMENTO POSTERIORE

IPACK (**I**nfiltration of the interspace between **P**opliteal **A**rtery and posterior **C**apsule of the **K**nee)

20-30 mL Ropivacaine 0.2-0.3% between

Popliteal Artery and posterior Capsule of the Knee





N: Needle; A: Popliteal Artery; V: Popliteal Vein; C: Femoral Condyles; PC: Posterior Capsule

ANALGESIA COMPARTIMENTO POSTERIORE

Eur J Orthop Surg Traumatol. 2018 Oct;28(7):1391-1395. doi: 10.1007/s00590-018-2218-7. Epub 2018 May 2.

Comparison of adductor canal block and IPACK block (interspace between the popliteal artery and the capsule of the posterior knee) with adductor canal block alone after total knee arthroplasty: a prospective control trial on pain and knee function in immediate postoperative period.

Sankineani SR[1], Reddy ARC[2], Eachempati KK[3], Jangale A[1], Gurava Reddy AV[1].

Table 1 The patient characteristics of both groups

Patient characteristics	Group 1	Group 2
Age	60	61
Sex (male/female)	38/22	42/18
Height (cm)	163	159
Weight (Kg)	78	73
Duration of surgery (min)	68	66

In conclusion, ACB + IPACK is a promising technique that offers improved pain management in the immediate postoperative period without effecting the motor function around the knee joint resulting in better ROM and ambulation compared to ACB alone.

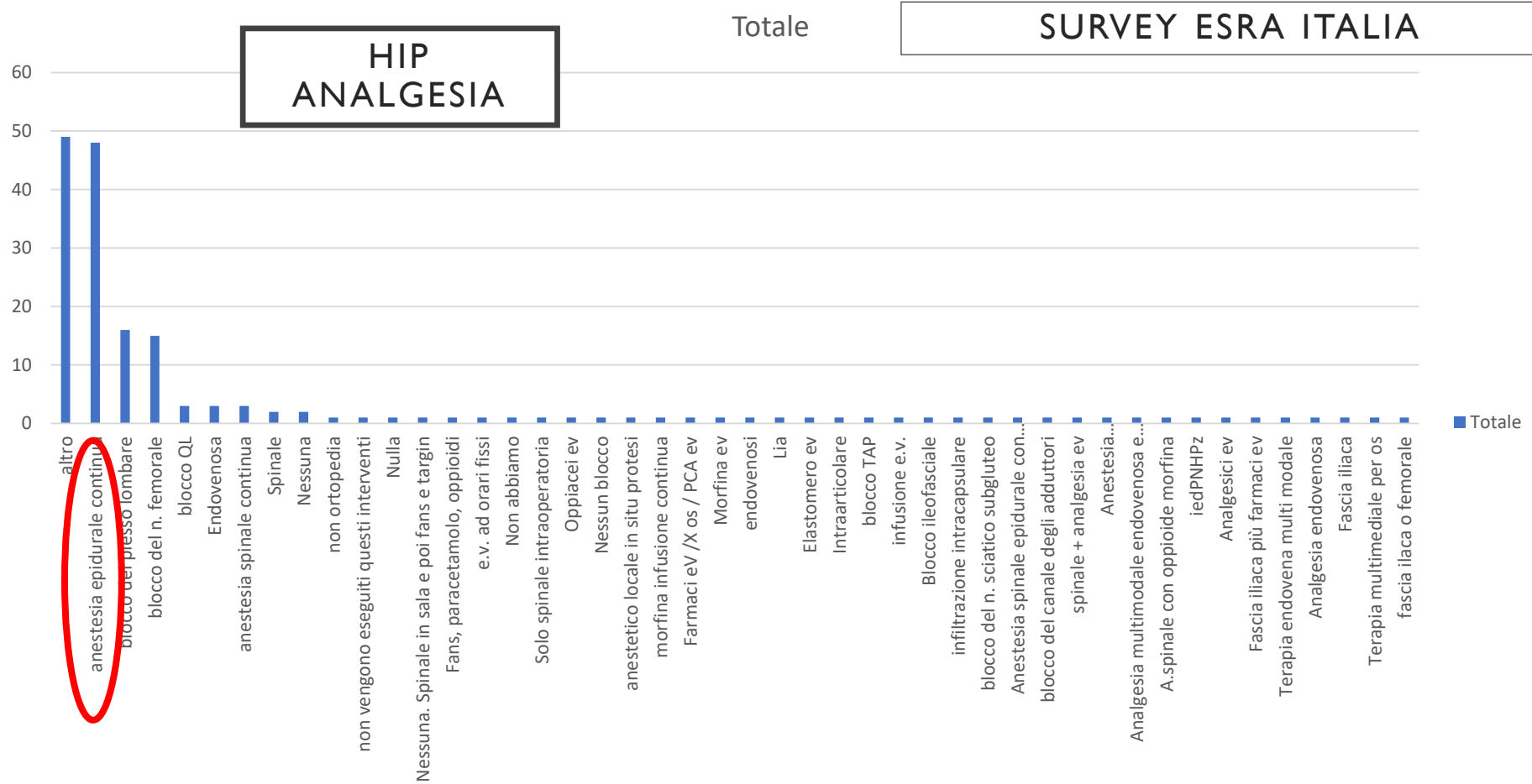
Table 2 The comparison of postoperative VAS scores and distance walked between both the groups

Variable	Adductor canal block + IPACK (Group 1, $n = 60$)	Adductor canal (Group 2, $n = 60$)	P value
VAS 8 h PO	1.4333 ± 0.6474	2.9167 ± 0.64550	< 0.001
VAS POD 1	2.05 ± 0.4323	3.1833 ± 0.72467	< 0.001
VAS POD 2	2.55 ± 0.7274	3.4500 ± 0.67460	< 0.001
ROM (°)	71.8333 ± 9.52	62.2500 ± 8.25	< 0.001
Distance walked day 3 (no. of steps)	8.51 ± 1.85	7.1333 ± 1.434	< 0.001

BACK TO REALITY

SURVEY ESRA ITALIA

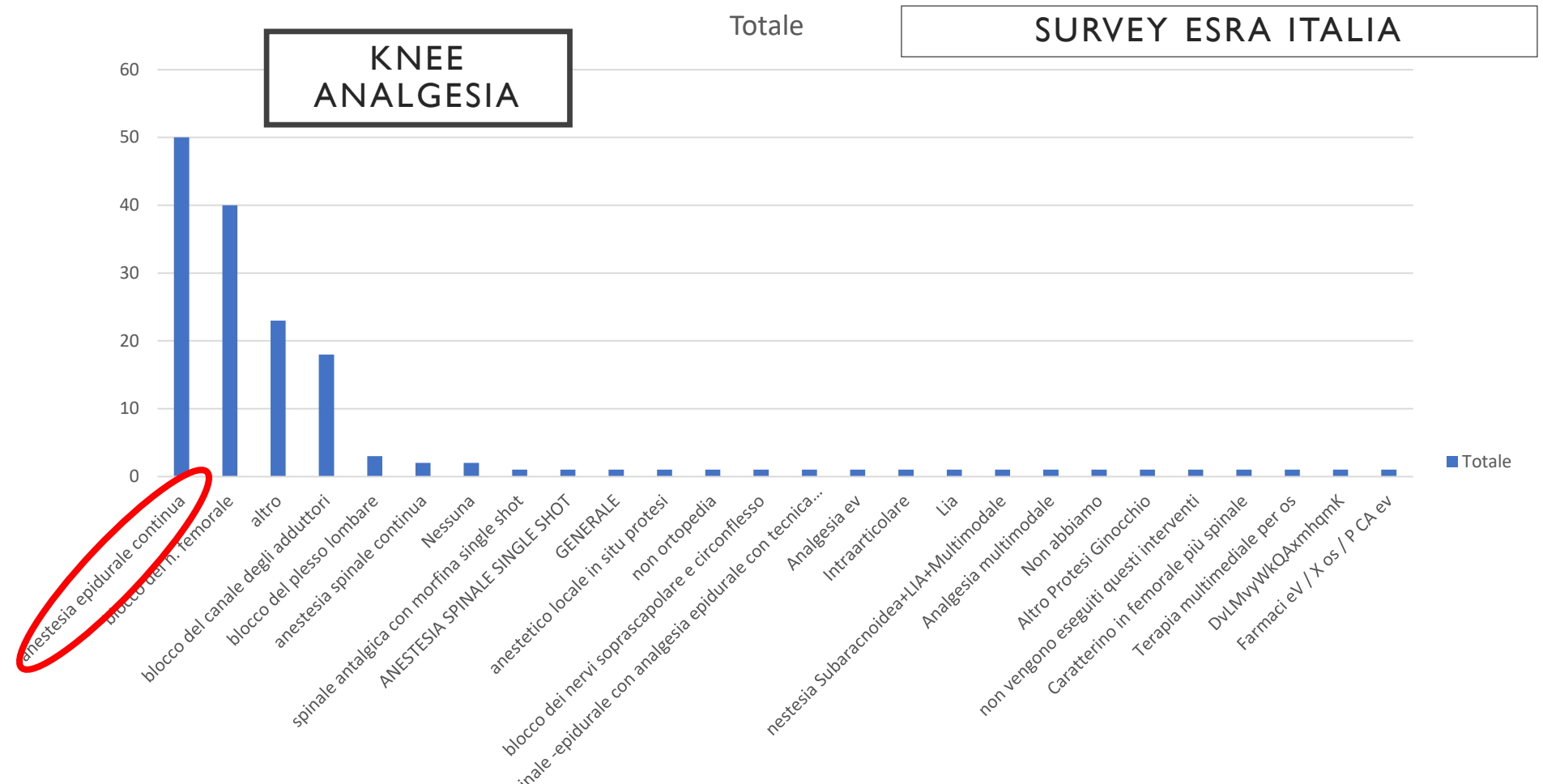
HIP ANALGESIA



BACK TO REALITY

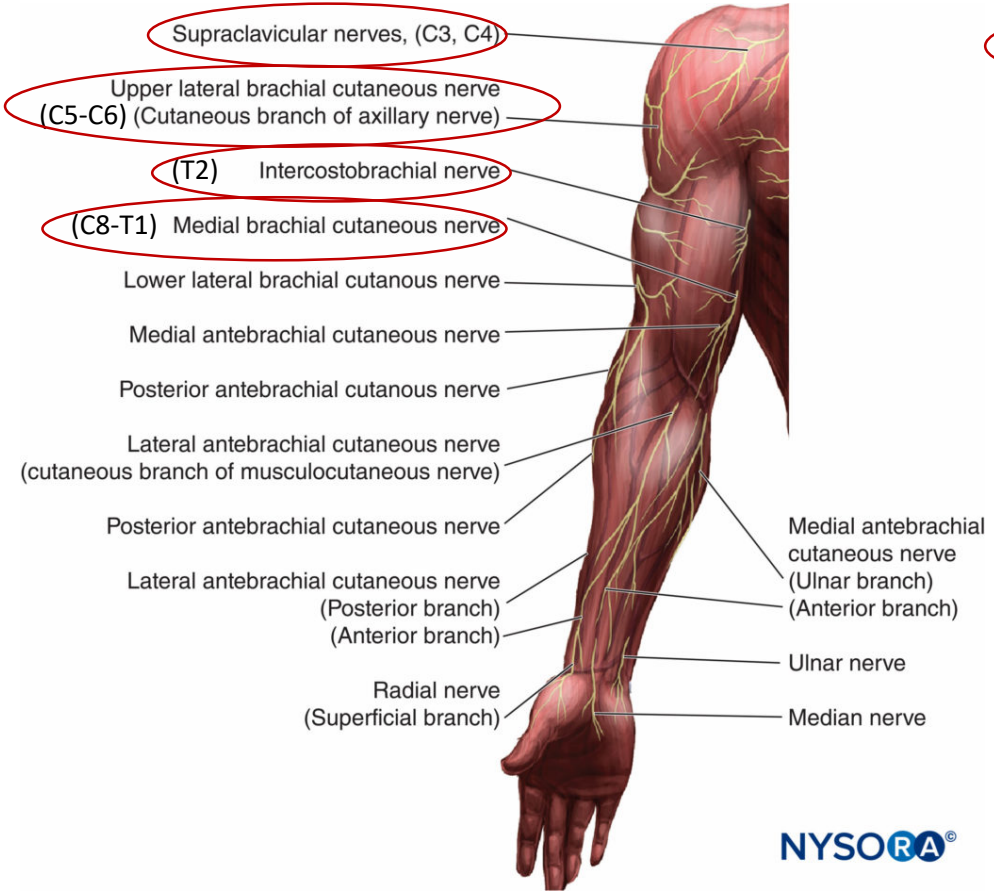
SURVEY ESRA ITALIA

KNEE ANALGESIA

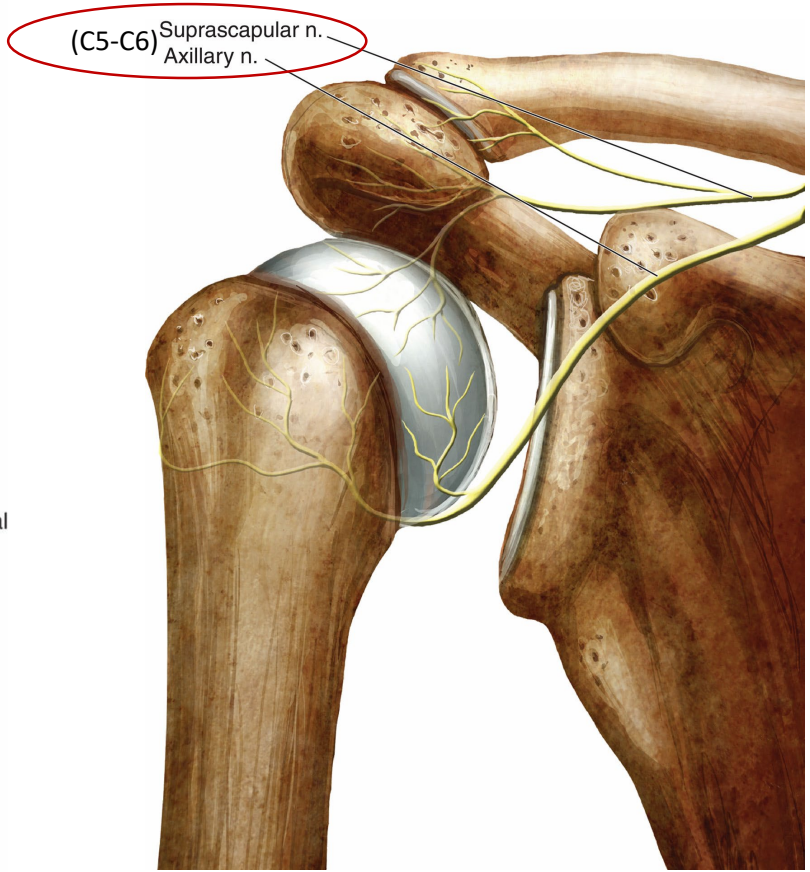


TECNICHE – ANALGESIA SPALLA

INNERVAZIONE CUTANEA



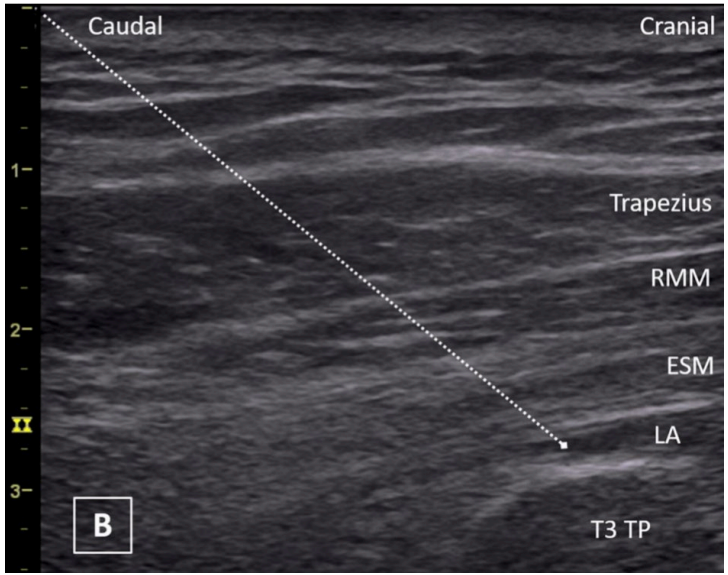
INNERVAZIONE ARTICOLARE

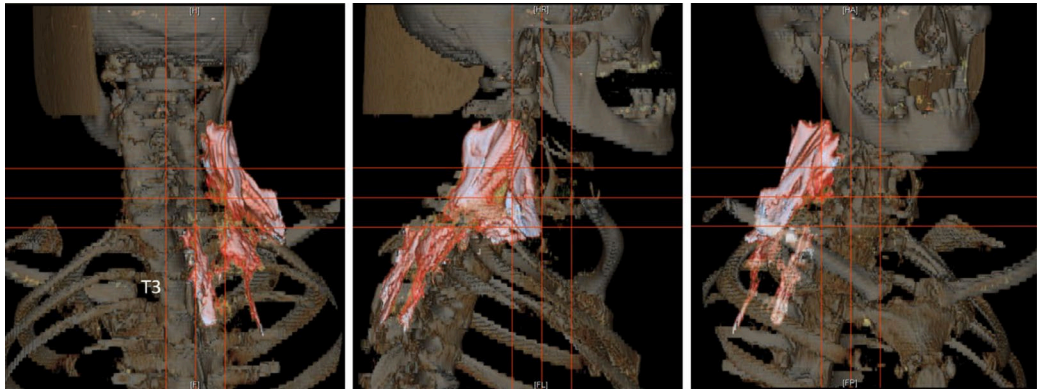


Erector spinae plane block for the management of chronic shoulder pain: a case report

Mauricio Forero, MD, FIPP · Manikandan Rajarathinam, MD, FIPP · Sanjib Das Adhikary, MD · Ki Jinn Chin, MBBS (Hons), MMed, FRCPC

Can J Anesth/J Can Anesth (2018) 65:288–293



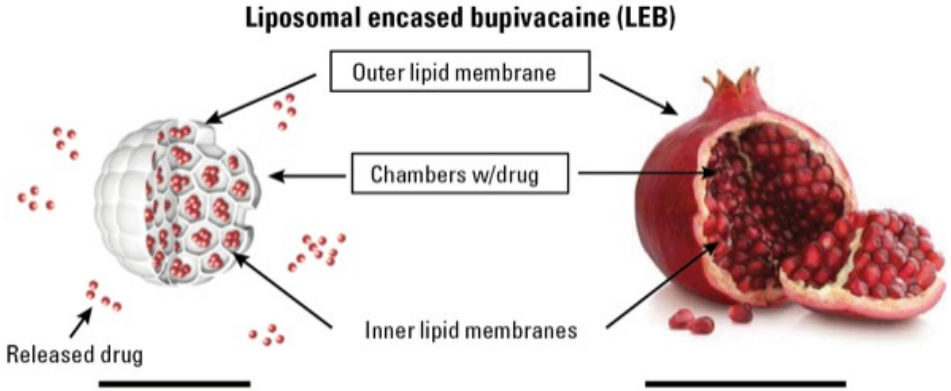


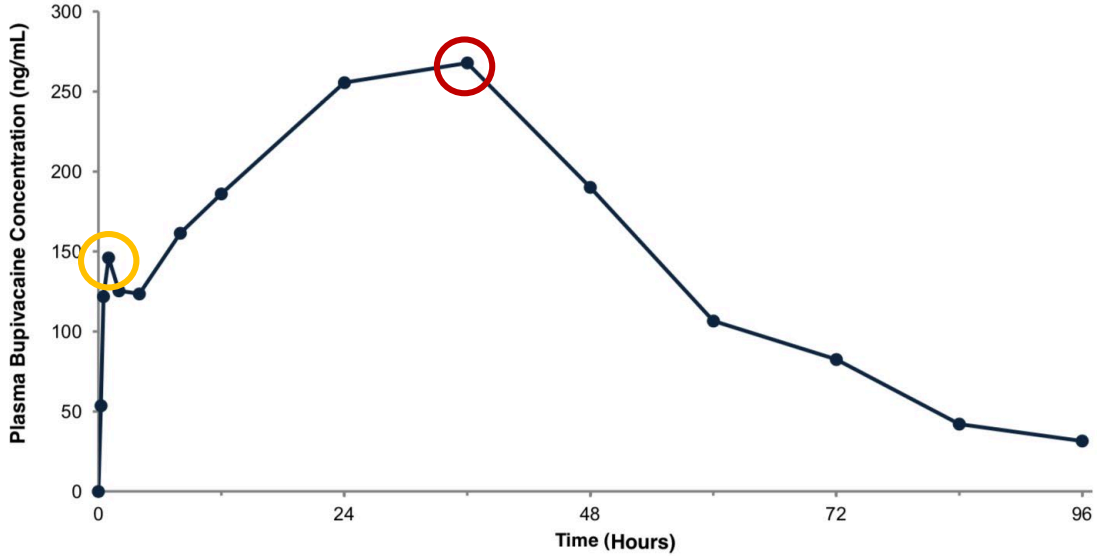
resulting in complete analgesia as before. The CT imaging two hours after injection showed radiocontrast tracking from T3 up to C3 and dispersing within the erector spinae muscle (Fig. 3). There was also visible anterior spread of contrast in the plane between the erector spinae and levator scapulae muscles into the vicinity of the neural foramina at C4-C7 (Fig. 4).

Within ten minutes, the patient reported complete resolution of pain and had regained full active range of motion in his shoulder, including abduction overhead to 180°. Neurological assessment at 30 min revealed and thumb. There was no clinically apparent motor blockade of the left upper limb (relative to the contralateral side) on testing of abduction-adduction at the shoulder, flexion-extension at the elbow and wrist, and hand-grip strength.

At follow-up 12 weeks later, the patient reported his left shoulder remained painfree at rest with only mild pain (2/

FARMACI – BUPIVACAINA LIPOSOMIALE





Clin Drug Investig. 2013 Feb;33(2):109-15. doi: 10.1007/s40261-012-0043-z.

Pharmacokinetic profile of liposome bupivacaine injection following a single administration at the surgical site.

Hu D[1], Onel E, Singla N, Kramer WG, Hadzic A.

Total Knee Arthroplasty	LB 133 mg	LB 266 mg
	n = 25	*n* = 24
C_{max} (ng/mL)	262 (277)	340 (107)
t_{max} (h)	12 (0.5, 37)	24 (0.5, 49)
	n = 23	*n* = 20
AUC_{∞} (ng•h/mL)	7,826 (3,317)	17,370 (8,540)
$t_{1/2}$ (h)	13.4 (4.0)	17.1 (6.8)

FARMACI – BUPIVACAINA LIPOSOMIALE

Medicine (Baltimore). 2017 Jun;96(25):e7190. doi: 10.1097/MD.0000000000007190.

Liposomal bupivacaine versus traditional bupivacaine for pain control after total hip arthroplasty: A meta-analysis.

Ma TT[1], Wang YH, Jiang YF, Peng CB, Yan C, Liu ZG, Xu WX.

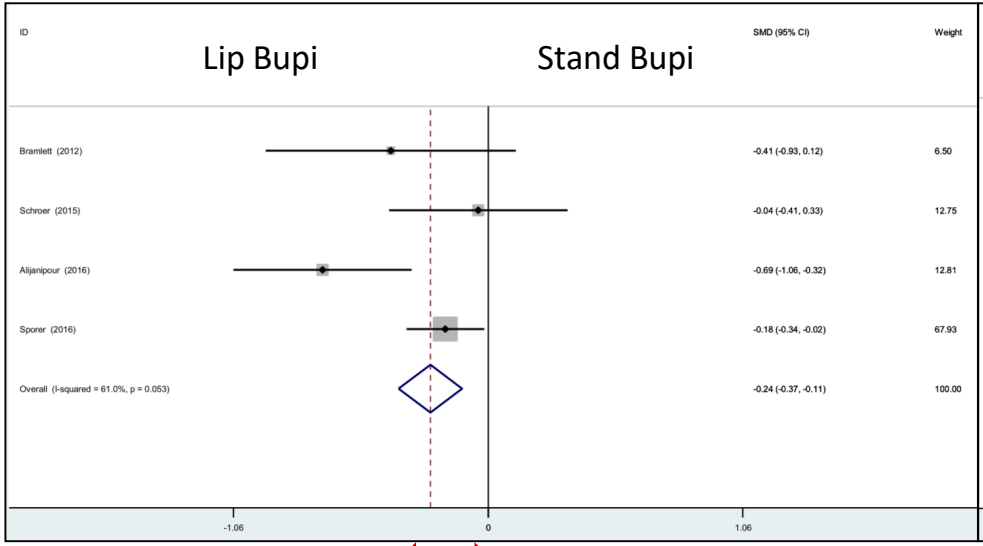
The subgroup analysis of the VAS at 24 hours, total morphine consumption, and the length of hospital stay.

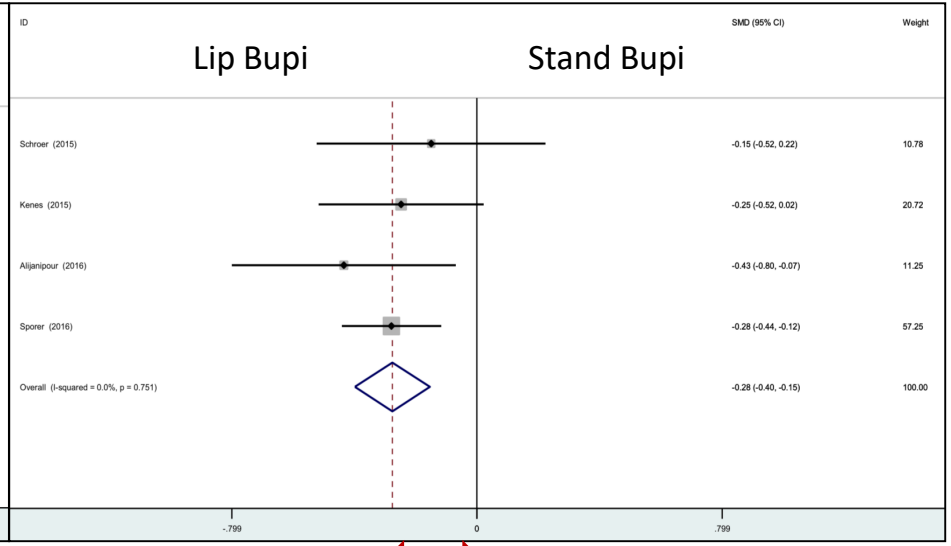
Subgroup or Outcomes	MD (95% CI)	I^2 (%)	*P*
VAS at 24 hours	−3.98 (−7.29 to −0.67)	15.5	.018
Spinal anesthesia	−2.34 (−5.29 to −1.21)	23.4	.014
Liposomal bupivacaine = 226 mg	−4.01 (−8.03 to −2.56)	31.1	.021
Total morphine consumption	−3.48 (−7.84 to 0.88)	70.1	.117
Spinal anesthesia	−5.22 (−7.29 to −1.66)	58.4	.014
Liposomal bupivacaine = 226 mg	−3.88 (−6.54 to −2.16)	45.9	.036
Length of hospital stay	−0.46 (−0.58 to −0.35)	26.2	.000
Spinal anesthesia	−0.52 (−0.67 to −0.16)	15.4	.001
Liposomal bupivacaine = 226 mg	−0.38 (−0.49 to −0.22)	11.3	.000

Int J Surg. 2017 Mar;39:238-248. doi: 10.1016/j.ijsu.2017.02.011. Epub 2017 Feb 10.

Comparison of peri-articular liposomal bupivacaine and standard bupivacaine for postsurgical analgesia in total knee arthroplasty: A systematic review and meta-analysis.

Wang X[1], Xiao L[1], Wang Z[1], Zhao G[1], Ma J[2].





VAS A 24 H

CONSUMO DI MORFINA A 24 H

Reg Anesth Pain Med. 2017 May/Jun;42(3):334-341. doi: 10.1097/AAP.0000000000000560.

Addition of Liposome Bupivacaine to Bupivacaine HCl Versus Bupivacaine HCl Alone for Interscalene Brachial Plexus Block in Patients Having Major Shoulder Surgery.

Vandepitte C[1], Kuroda M, Witvrouw R, Anne L, Bellemans J, Corten K, Vanelderen P, Mesotten D, Leunen I, Heylen M, Van Boxstael S, Golebiewski M, Van de Velde M, Knezevic NN, Hadzic A.

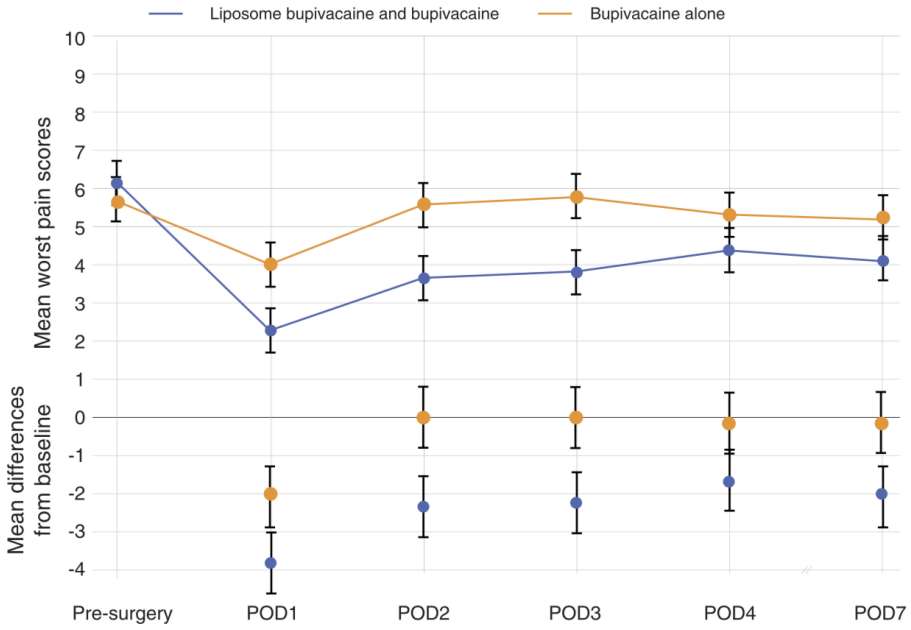


TABLE 4. Adverse Effects Reported by Patients Undergoing ISBPB for Major Shoulder Surgery With 15-mL Liposome Bupivacaine Added to Standard Bupivacaine (10 mL/133-mg Liposome Bupivacaine + 5-mL 0.25% Standard Bupivacaine) (n = 26) or 15-mL 0.25% Standard Bupivacaine Alone (n = 24) for Postoperative Pain Management

Adverse Effect*	Liposome Bupivacaine + Standard Bupivacaine (n = 26)	Standard Bupivacaine (n = 24)
Unique patients reporting adverse effects†	17 (65)	10 (42)
Hoarseness	14 (82)	7 (70)
Dizziness	5 (29)	4 (40)
Ear ringing	3 (18)	1 (10)
Metallic taste	1 (6)	2 (20)
Shortness of breath		4 (40)
Vision impairment	1 (6)	
Pulmonary embolism‡	1 (6)	

ment in the same postoperative interval seems to support this finding. Future dose-ranging studies of the liposome bupivacaine-standard bupivacaine mixture are indicated to determine optimal dosing and mixture regimens that prolong postoperative analgesia

FARMACI – ANALGESIA POSTOPERATORIA

The Journal of Pain, Vol 17, No 2 (February), 2016: pp 131-157
Available online at www.jpain.org and www.sciencedirect.com

Guidelines on the Management of Postoperative Pain

Management of Postoperative Pain: A Clinical Practice Guideline From the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council

American Pain Society

RESEARCH
EDUCATION
TREATMENT
ADVOCACY

PUBLISHED BY ELSEVIER

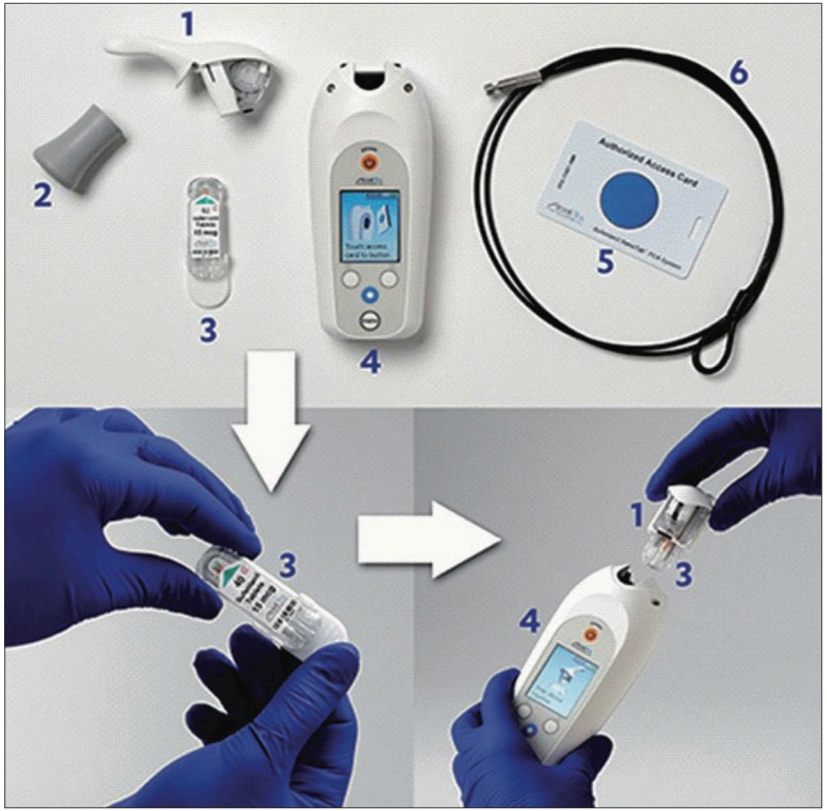
Recommendation 10

- The panel recommends oral over intravenous (i.v.) administration of opioids for postoperative analgesia in patients who can use the oral route (strong recommendation, moderate quality evidence).

Recommendation 12

- The panel recommends that i.v. patient-controlled analgesia (PCA) be used for postoperative systemic analgesia when the parenteral route is needed (strong recommendation, moderate-quality evidence).

FARMACI – SUFENTANIL SUBLINGUAL TABLET SYSTEM



Anesthesiology. 2015 Aug;123(2):434-43. doi: 10.1097/ALN.0000000000000746.

Sufentanil Sublingual Tablet System for the Management of Postoperative Pain after Knee or Hip Arthroplasty: A Randomized, Placebo-controlled Study.

Jove M[1], Griffin DW, Minkowitz HS, Ben-David B, Evashenk MA, Palmer PP.

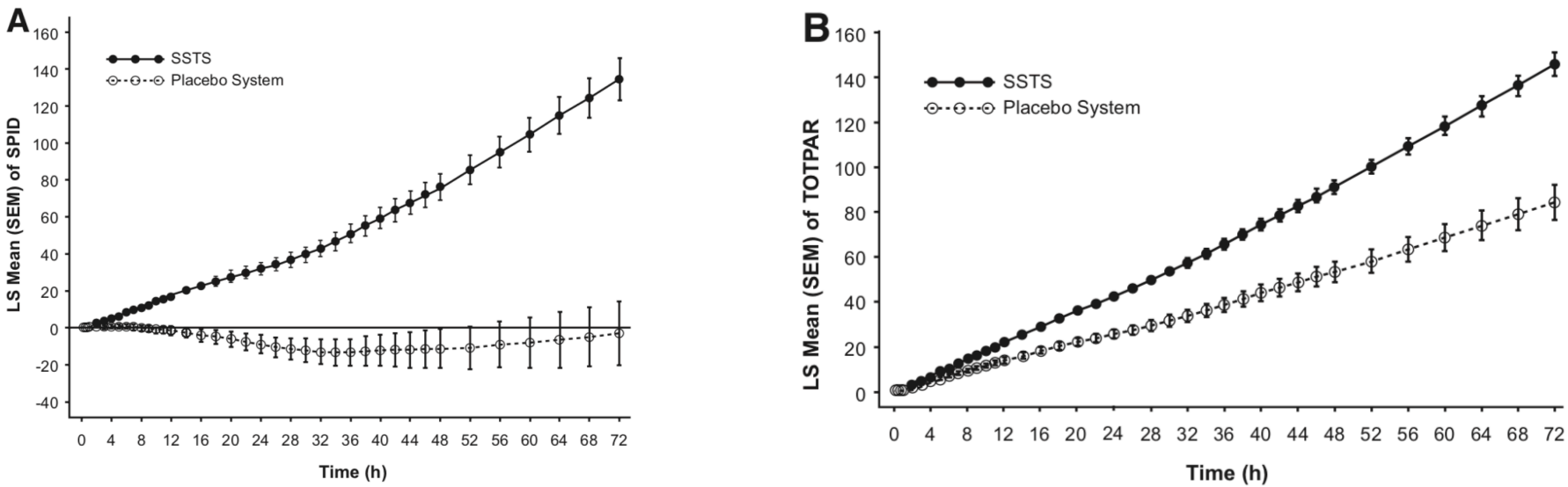


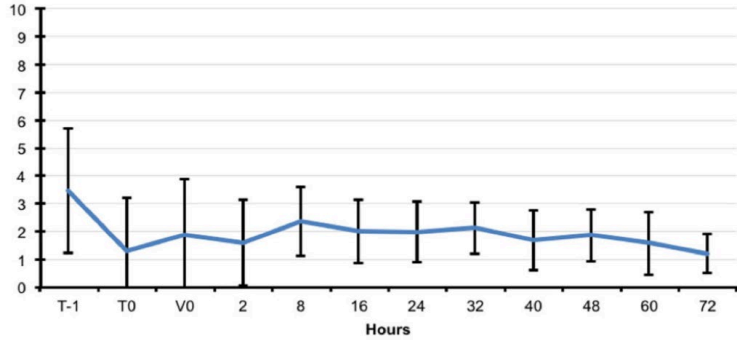
Fig. 2. Least squares (LS) mean (SEM) of (*A*) time-weighted summed pain intensity difference (SPID) and (*B*) total pain relief (TOTPAR) by evaluation time point (intent-to-treat population). Significant differences occurred between treatment groups at all time points from 2 to 72 h ($P < 0.001$). SSTS = sufentanil sublingual tablet system.

J Exp Orthop. 2018 Mar 20;5(1):8. doi: 10.1186/s40634-018-0123-y.

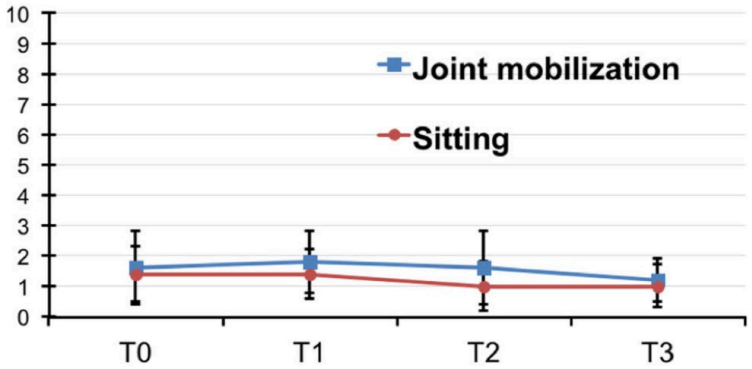
Sublingual sufentanil tablet system Zalviso® for postoperative analgesia after knee replacement in fast track surgery: a pilot observational study.

Scardino M[1], D'Amato T[1], Martorelli F[1], Fenocchio G[1], Simili V[1], Di Matteo B[2], Bugada D[3,4], Kon E[5].

NRS

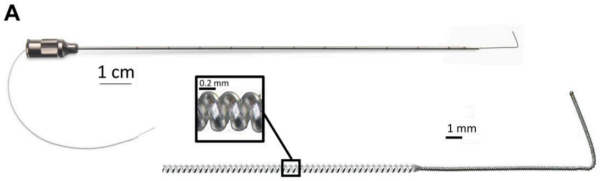


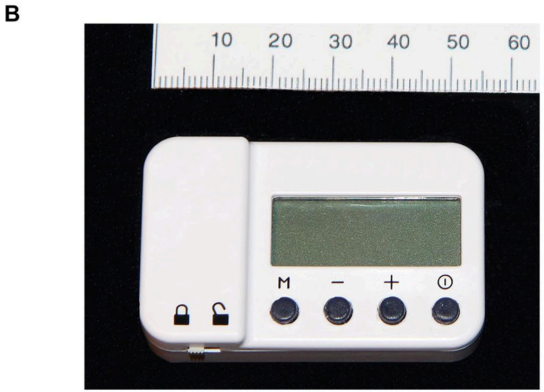
mNRS

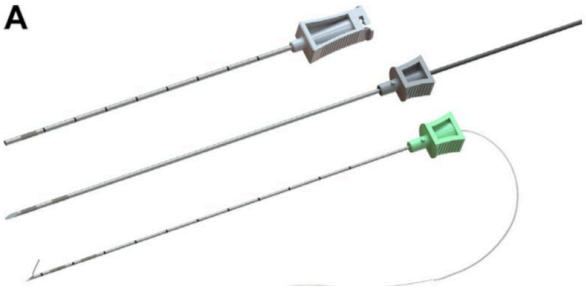


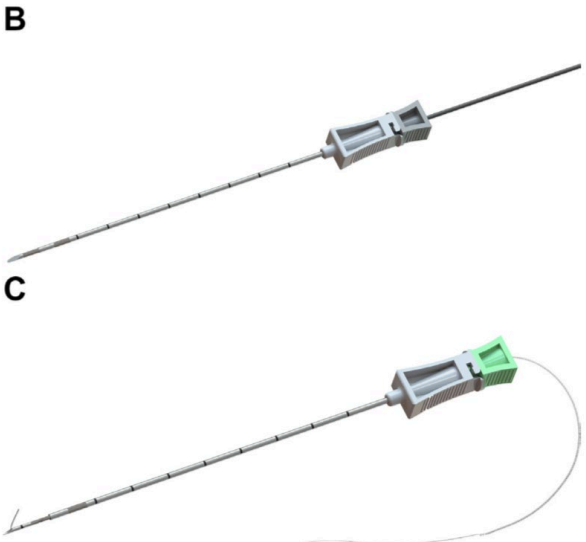
	SSTS (95)	cFNB (87)	*p value*
AEs, n (%)			
Overall n. events	7	132	< 0.001[c]
Overall n. patients (%)	1 (1)	42 (48)	< 0.001[c]
Nausea			
Vomiting	2 (1)	24 (28)	< 0.001[c]
PONV	2 (2)	61 (70)	< 0.001[3]
Erythema	1 (1)	5 (6)	ns
Dizziness	1 (1)	15 (17)	< 0.001[c]
Numbness	0	47 (54)	

DISPOSITIVI – NEUROMODULAZIONE PERCUTANEA







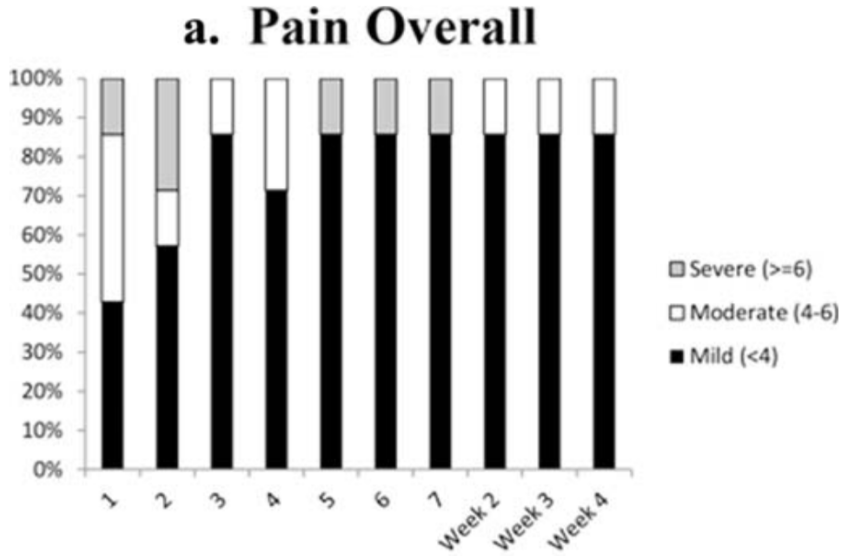


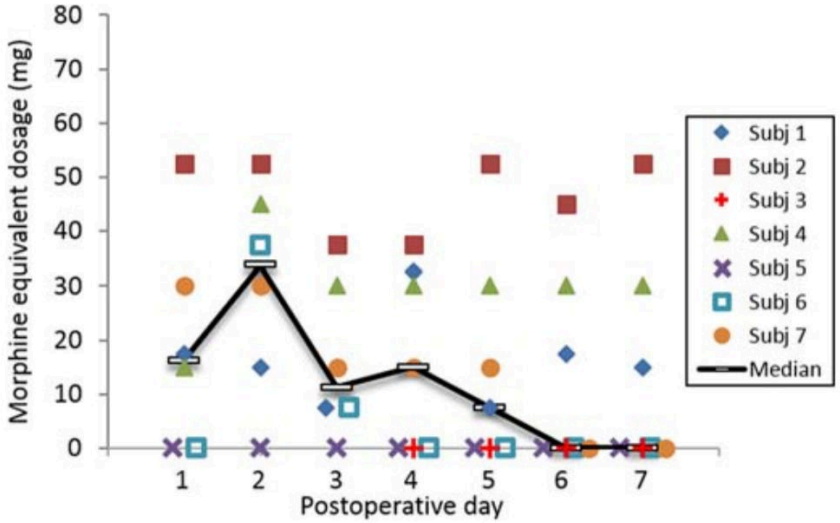
Recentemente approvato dalla US Food and Drug Administration anche per il trattamento del Dolore Acuto Postoperatorio

Neuromodulation. 2018 Jul 19. doi: 10.1111/ner.12790. [Epub ahead of print]

A Feasibility Study of Percutaneous Peripheral Nerve Stimulation for the Treatment of Postoperative Pain Following Total Knee Arthroplasty.

Ilfeld BM[1,2], Ball ST[3], Gabriel RA[1,2], Sztain JF[1], Monahan AM[1], Abramson WB[1], Khatibi B[1], Said ET[1], Parekh J[3], Grant SA[4], Wongsarnpigoon A[5], Boggs JW[5].

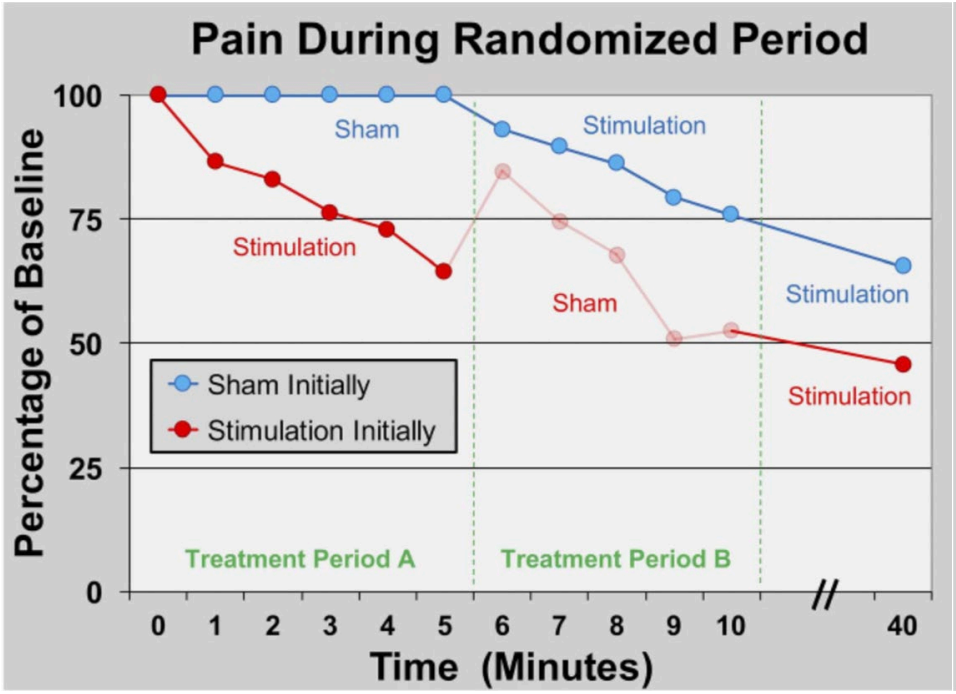


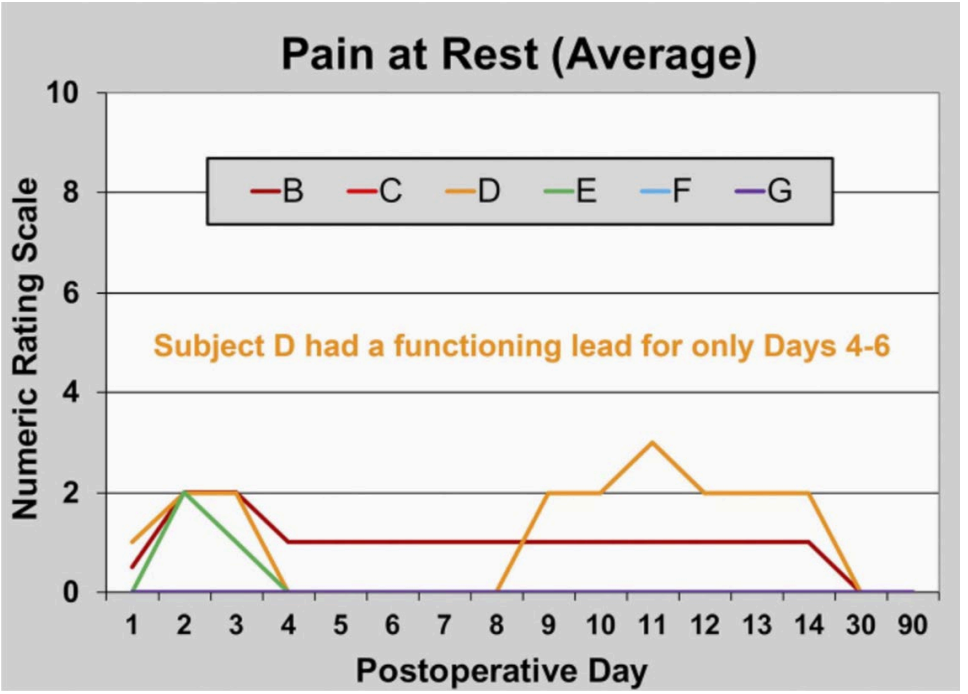


Reg Anesth Pain Med. 2018 Aug;43(6):580-589. doi: 10.1097/AAP.0000000000000819.

Ultrasound-Guided Percutaneous Peripheral Nerve Stimulation: Neuromodulation of the Sciatic Nerve for Postoperative Analgesia Following Ambulatory Foot Surgery, a Proof-of-Concept Study.

Ilfeld BM, Gabriel RA, Said ET, Monahan AM[1], Sztain JF, Abramson WB, Khatibi B, Finneran JJ 4th, Jaeger PT, Schwartz AK[2], Ahmed SS[2].

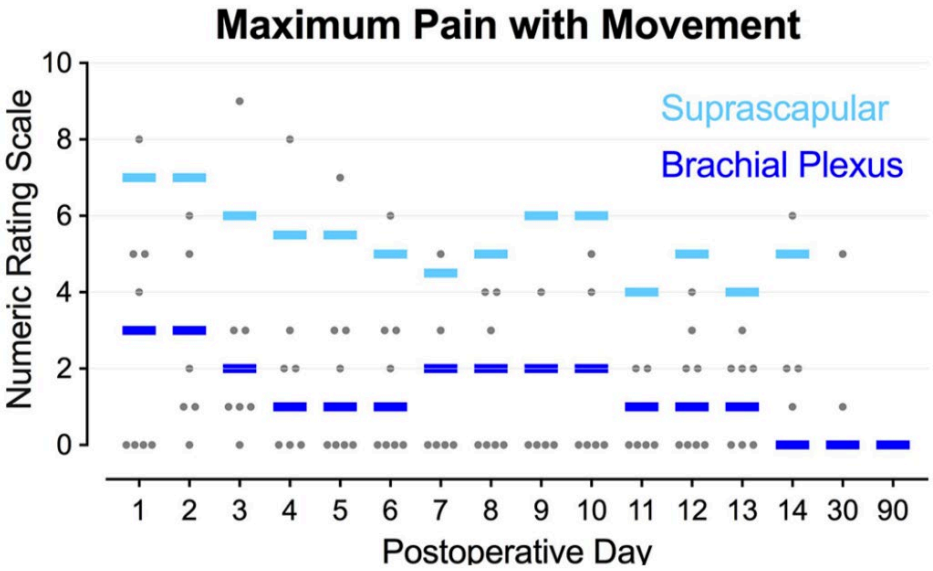


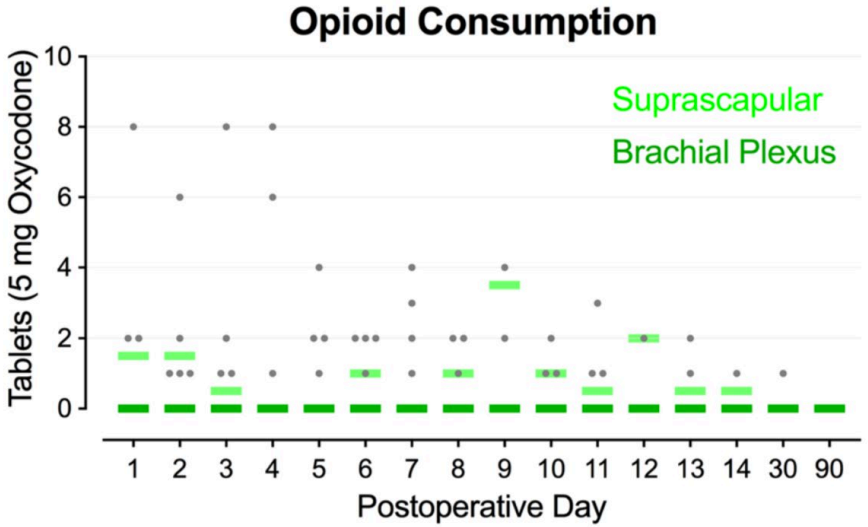


Reg Anesth Pain Med. 2019 Feb 15. pii: rapm-2018-100121. doi: 10.1136/rapm-2018-100121. [Epub ahead of print]

Ultrasound-guided percutaneous peripheral nerve stimulation: neuromodulation of the suprascapular nerve and brachial plexus for postoperative analgesia following ambulatory rotator cuff repair. A proof-of-concept study.

Ilfeld BM[1,2], Finneran JJ 4th[3,2], Gabriel RA[3,2], Said ET[3], Nguyen PL[3], Abramson WB[3], Khatibi B[3], Sztain JF[3], Swisher MW[3,2], Jaeger P[3,2,4], Covey DC[5], Meunier MJ[5], Hentzen ER[5], Robertson CM[5].





REGIONAL ANESTHESIA AND ACUTE PAIN

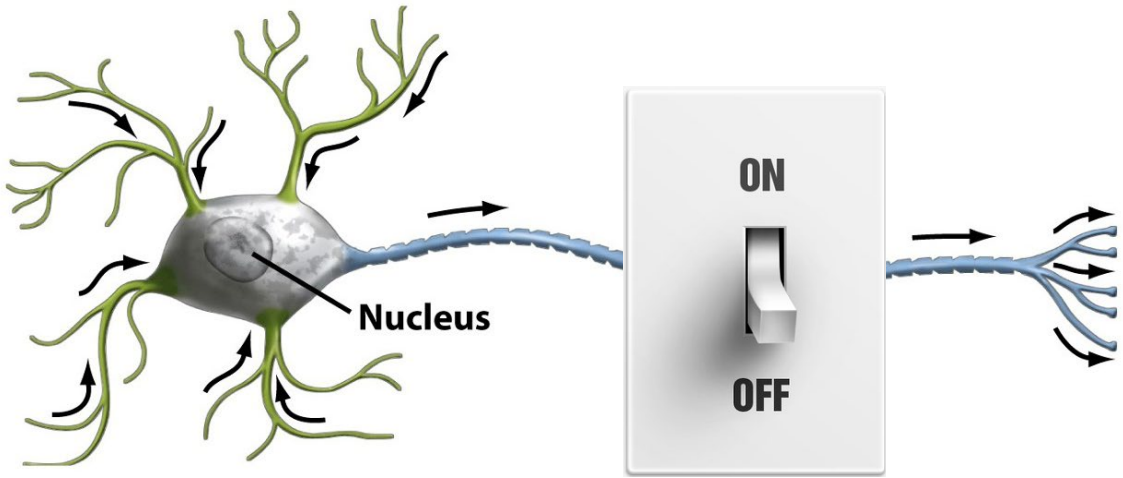
DARING DISCOURSE

OPEN

Ultrasound-Guided Percutaneous Peripheral Nerve Stimulation for Postoperative Analgesia

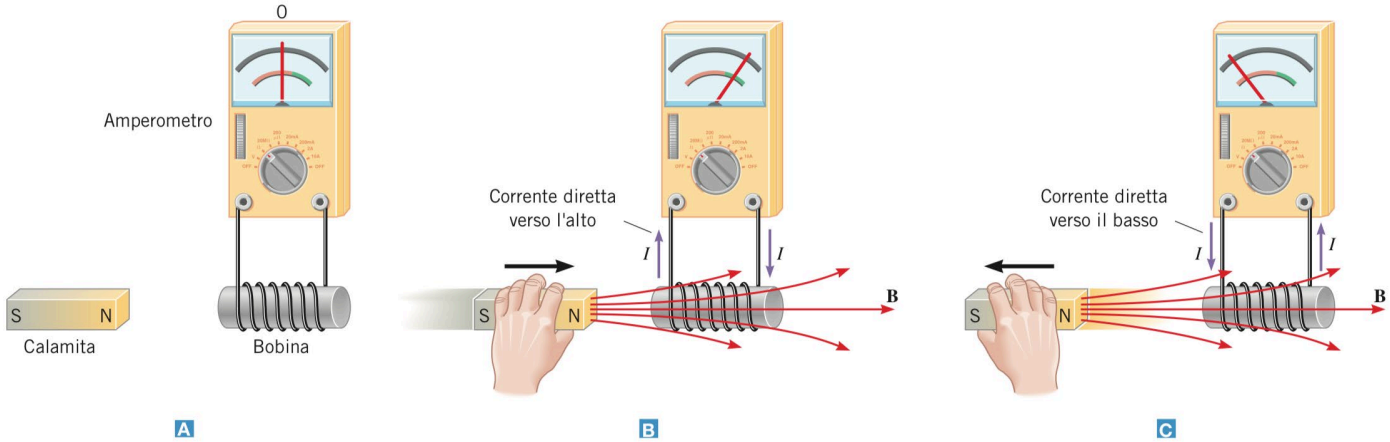
Could Neurostimulation Replace Continuous Peripheral Nerve Blocks?

Brian M. Ilfeld, MD, MS, and Stuart A. Grant, MB, ChB†*



Ma una corrente elettrica genera un campo magnetico…

...e un campo magnetico può generare una corrente elettrica



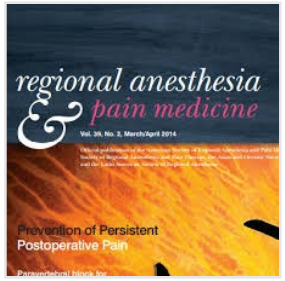
■ LEGGE DI FARADAY-NEUMANN

La f.e.m. media indotta in un circuito è:

$$\mathscr{E} = -\frac{\Delta\Phi(\vec{\mathbf{B}})}{\Delta t} \qquad (23.2)$$

dove $\Delta\Phi(\vec{\mathbf{B}}) = \Phi[\vec{\mathbf{B}}(t)] - \Phi_0[\vec{\mathbf{B}}(t_0)]$ è la variazione di flusso magnetico attraverso una qualsiasi superficie delimitata dal circuito, e $\Delta t = t - t_0$ è l'intervallo di tempo in cui avviene questa variazione.

FUTURO O FANTASCIENZA?



SICUREZZA

2015

Pathophysiology and Etiology of Nerve Injury Following Peripheral Nerve Blockade

Richard Brull, MD, FRCPC, Admir Hadzic, MD, PhD,† Miguel A. Reina, MD, PhD,‡ and Michael J. Barrington, PhD, MBBS, FANZCA§*

only **38% of patients** experienced paresthesia during real-time visualization of needle-nerve contact…Ultrasoundguided PNB often involves **multiple injections…**

Il 62% dei pazienti che hanno un ago nel nervo non se ne accorge!!!

Incidence and Effects of Unintentional Intraneural Injection During Ultrasound-Guided Subgluteal Sciatic Nerve Block

Hara, Kaoru MD; Sakura, Shinichi MD; Yokokawa, Naomi MD; Tadenuma, Saki MD

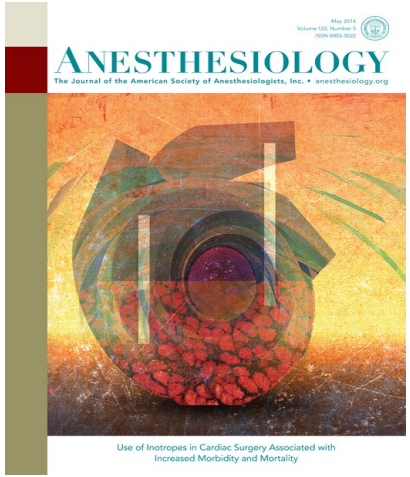
16.3%

Regional Anesthesia and Pain Medicine: May/June 2012 - Volume 37 - Issue 3 - p 289–293

Opening Injection Pressure Consistently Detects Needle–Nerve Contact during Ultrasound-guided Interscalene Brachial Plexus Block

Jeff C. Gadsden, M.D., F.R.C.P.C., F.A.N.Z.C.A., Jason J. Choi, M.D., Emily Lin, M.D., Allegra Robinson, R.N.

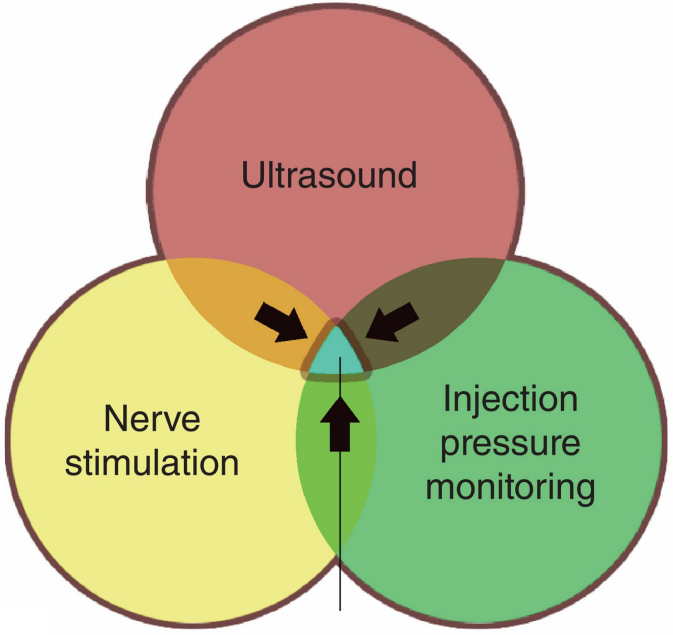
2014

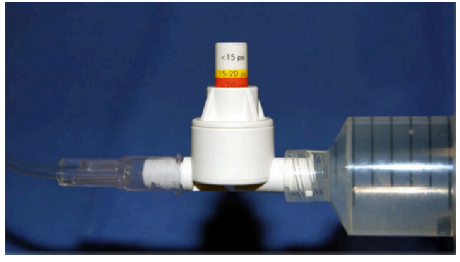


	psi	*P* Value*	mA	*P* Value*
Precontact				
C5	8.4±2.2	<0.001	0.7±0.5	0.004
C6	8.8±2.5	<0.001	0.6±0.3	0.001
C7	9.0±1.6	<0.001	0.5±0.3	0.18
Needle–nerve contact				
C5	22.4±4.2		0.3±0.3	
C6	19.9±3.7		0.2±0.1	
C7	19.0±3.4		0.3±0.3	
Disengagement				
C5	9.0±3.9	<0.001	0.6±0.4	0.07
C6	9.2±3.1	<0.001	0.5±0.5	0.02
C7	8.1±1.1	<0.001	0.7±0.4	0.09

These results suggest that HIGH (≥**15 PSI**) OPENING INJECTION PRESSURE may indicate needle–nerve contact and avoiding injection in this condition might improve patient safety

TRIPLO MONITORAGGIO



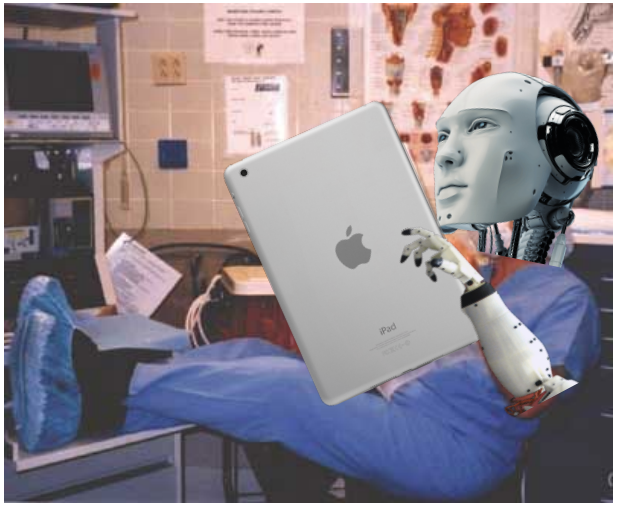



BACK TO THE FUTURE
ANALGESIA PROLUNGATA
SICUREZZA DEL PAZIENTE
OUTATIME
RECUPERO MOTORIO RAPIDO

PAST

PRESENT

FUTURE



GRAZIE!

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