Pain Management Post-TKA: Can we get Opioid Free?

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I have nothing to disclose.

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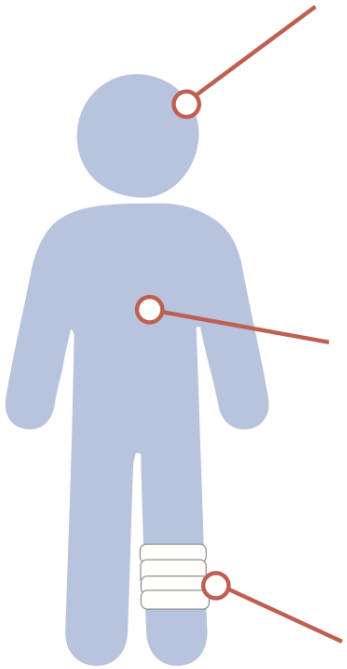

Processing of pain:

- cognitive behavioral therapy*
- patient education*
- acetaminophen*
- opioids†, gabapentinoids†, ketamine†

Transmission of pain:

- regional analgesia*
- opioids†, gabapentinoids†, ketamine†

Source of pain:

- compression*, cryotherapy*
- local anesthetics*
- non-steroidal anti-inflammatory drugs (NSAIDs)*

Office=>Surgery=>Post-op

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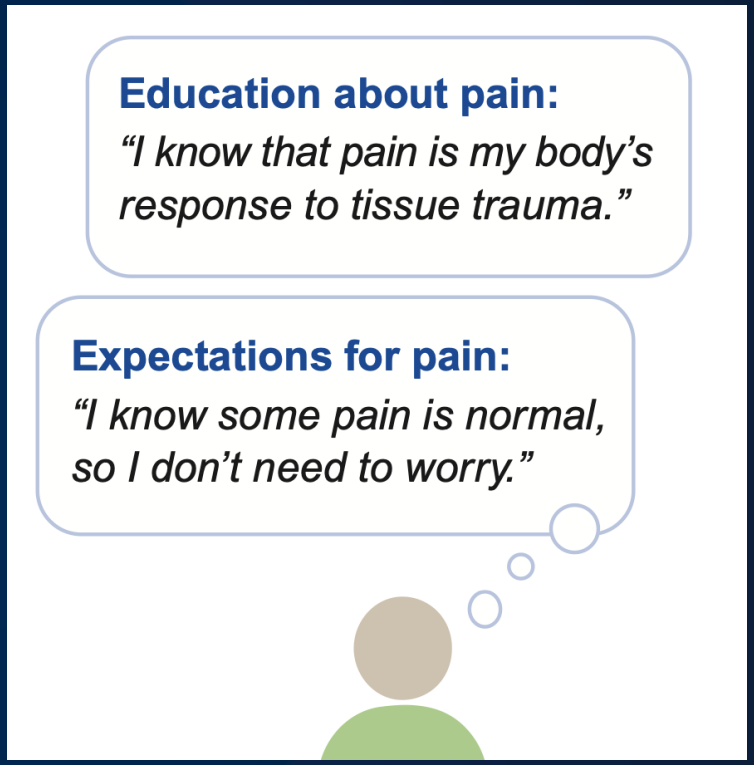
Office

- Patient education
- Optimize medical conditions related to pain
  - Anxiety
  - Fibromyalgia
  - Substance abuse
- Cognitive Behavioral Therapy
- Hyponosis



ttps://alosahealth.org/wp-content/uploads/2022/11/UnAd_VascularSurgery_8.22_final.pdf
ront. Surg., 03 March 2022 Sec. Visceral Surgery Volume 9 - 2022 |
ttps://doi.org/10.3389/fsurg.2022.801742

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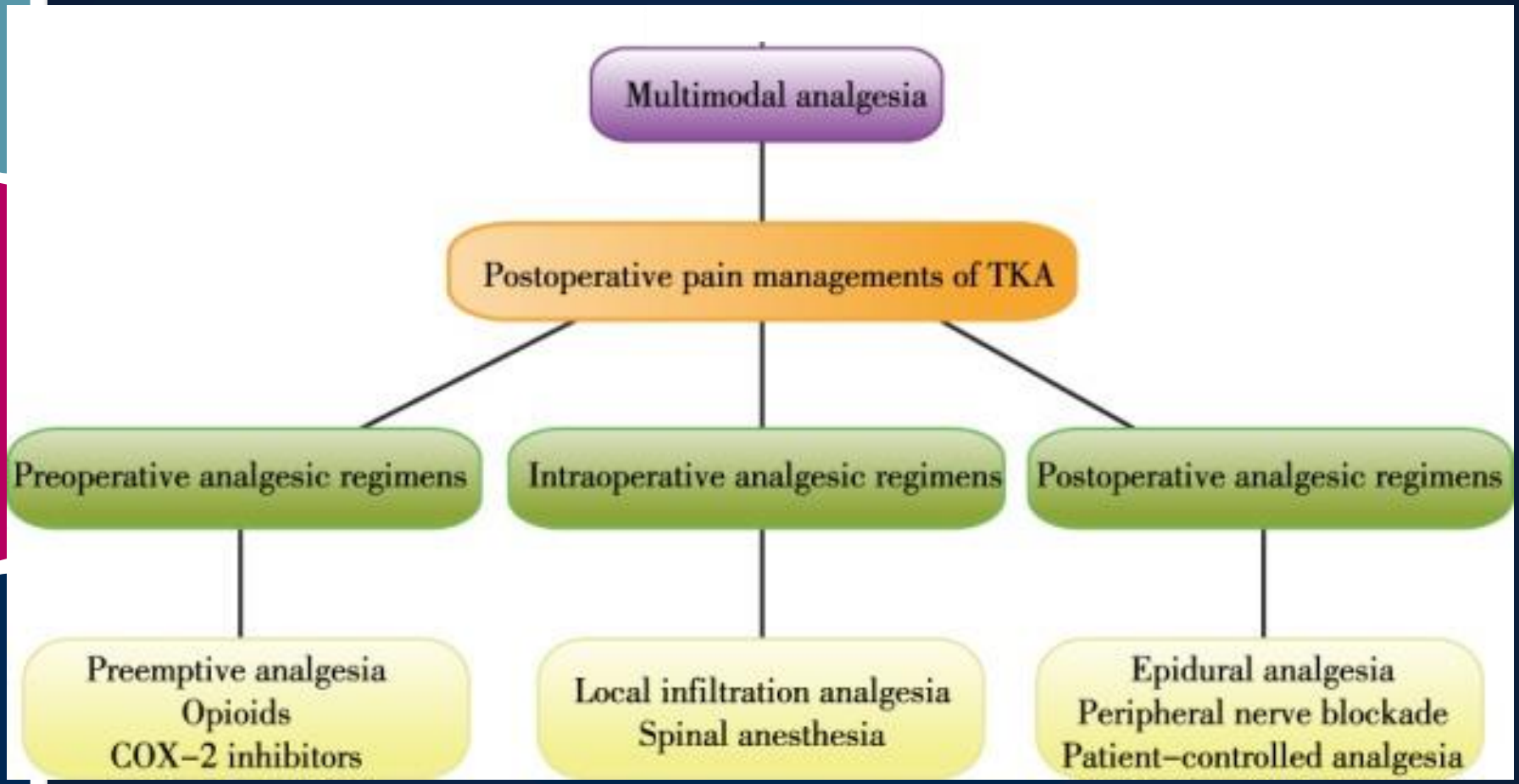
Multimodal Analgesia



Orthop Surg. 2019 Oct; 11(5): 755–761.

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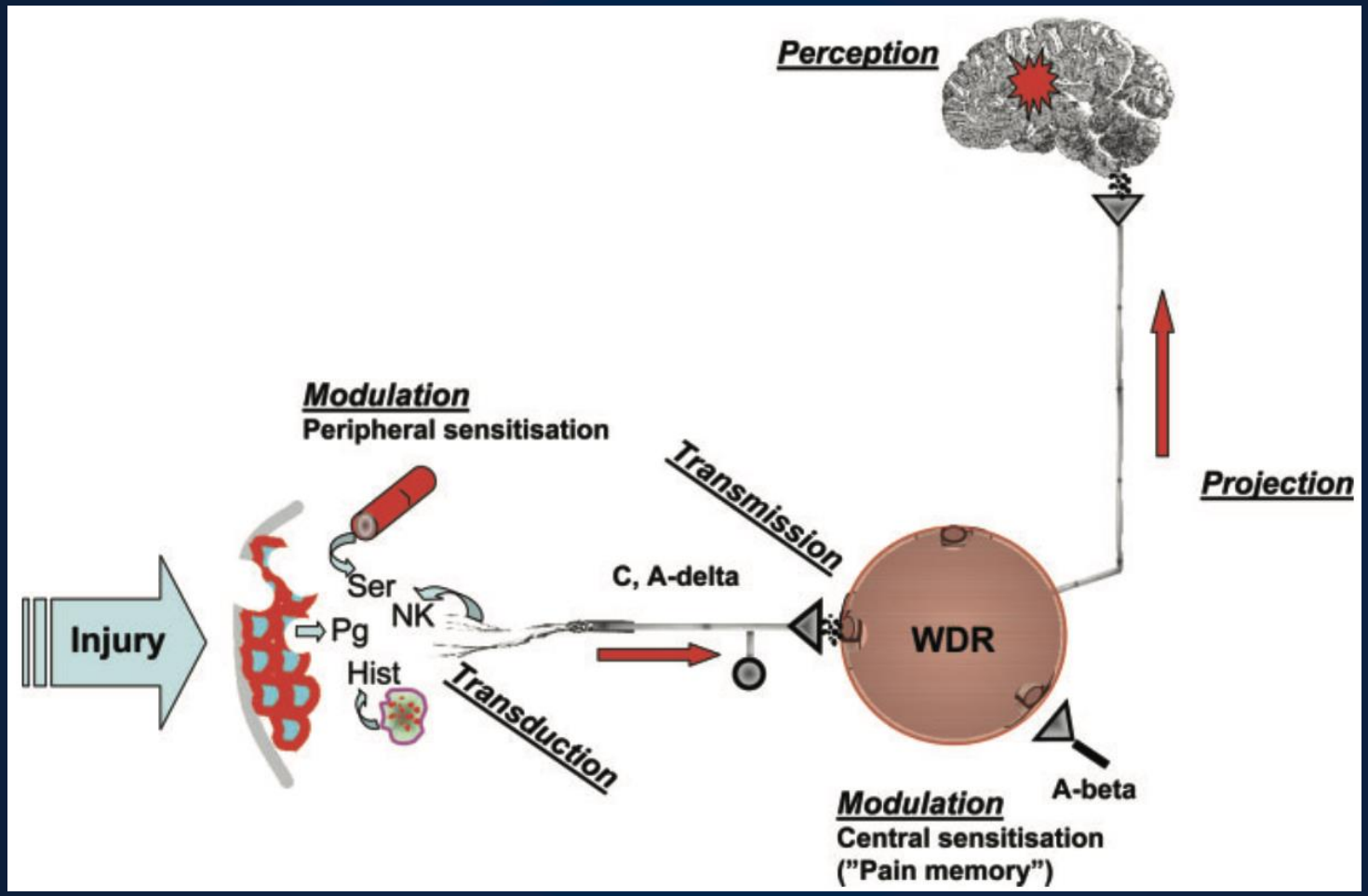
Pre-Emptive Analgesia



Br Med Bull 2004 Dec 13:71:13-27.

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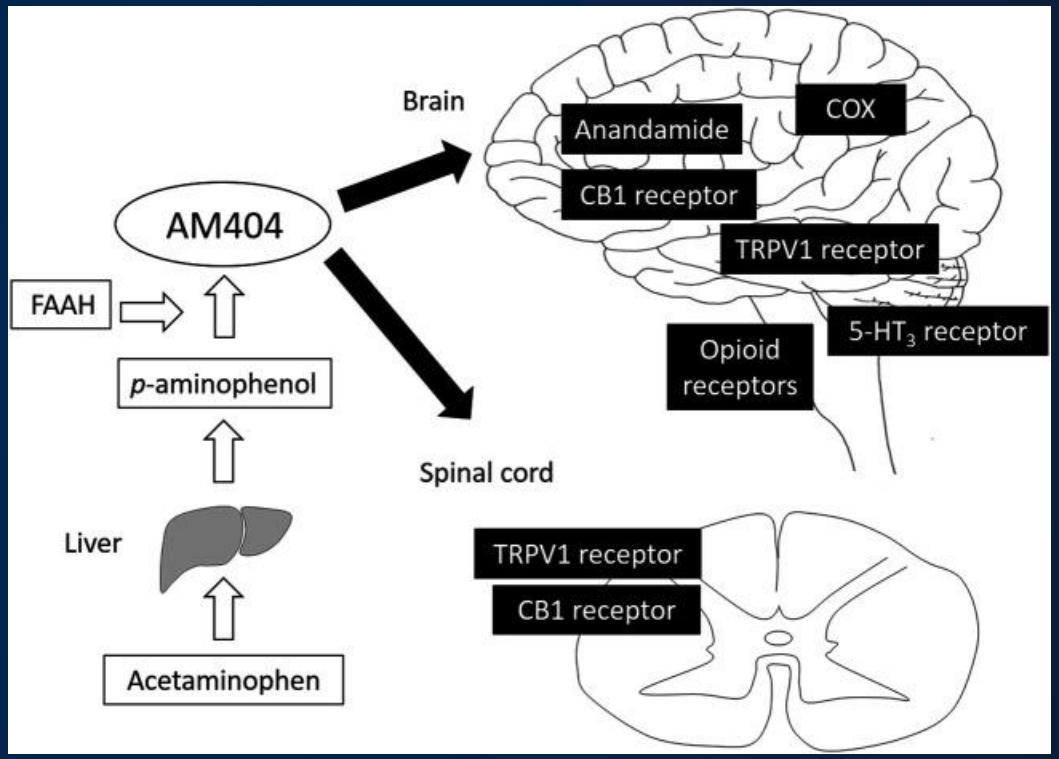
Acetaminophen

- Metabolized by liver
- CNS mechanism
- Common in all phases of pain:
  - Pre-Emptive
  - Intra-op
  - Post-op



Front Pharmacol. 2020; 11: 580289.

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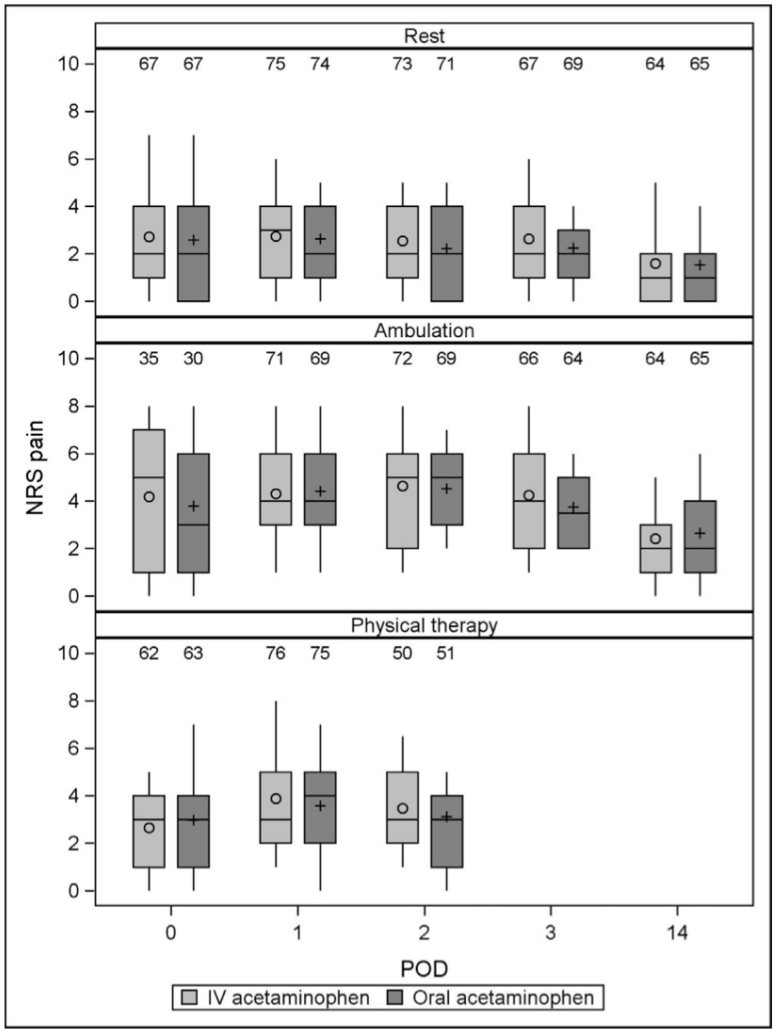
IV Acetaminophen

- RCT IV vs. Oral Q6 hours
- THA
- No difference in pain or opioid usage over 3 days



J Arthroplasty 2019 Jul;34(7S):S215-S220.

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Perioperative Anesthesia and Analgesia in Total Joint Arthroplasty Guidelines 2020

The Efficacy and Safety of Acetaminophen in Total Joint Arthroplasty: Systematic Review and Direct Meta-Analysis

- Moderate evidence: oral and IV acetaminophen during the inpatient hospitalization
- Strong evidence: safety of oral and IV acetaminophen

J Arthroplasty 2020 Oct;35(10):2715-2729.

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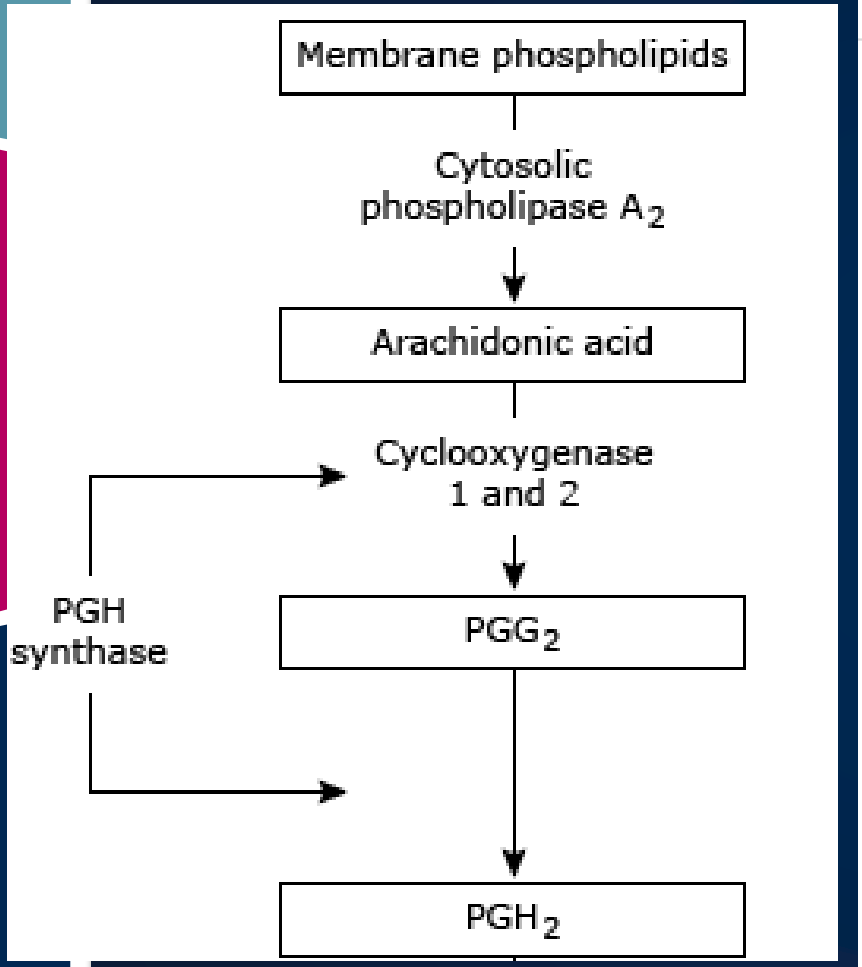
NSAIDS



COX selectivity and half-life of selected NSAIDs

Drug	COX-1/COX-2 IC_{50} ratio *[1]	Half-life ¶[2]
Ibuprofen	0.5	2 hours
Naproxen	0.7	12 to 17 hours
6-MNA (active metabolite of nabumetone)	1.5	24 hours
Acetaminophen	1.6	2 to 3 hours
Indomethacin	1.9	4.5 hours
Meloxicam	18	15 to 22 hours
Diclofenac	29	2 hours
Celecoxib	30	11 hours
Rofecoxib Δ	267	17 hours[3]

Up to date, accessed 8/2024

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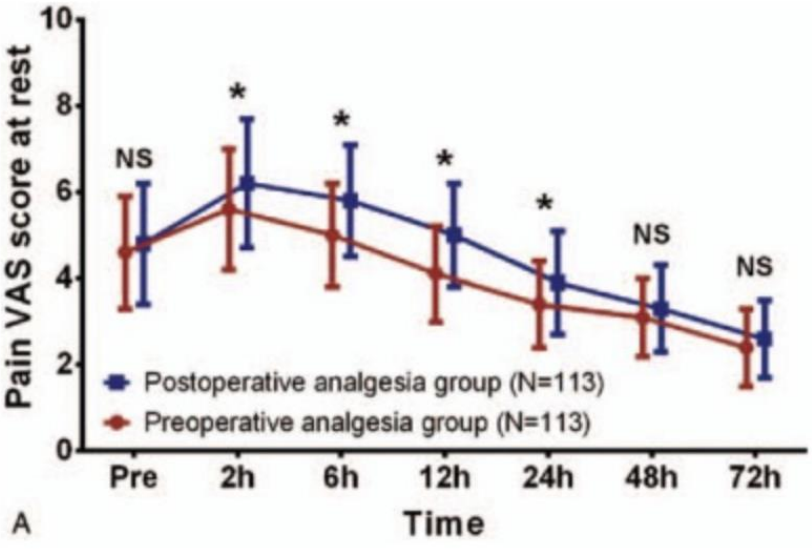
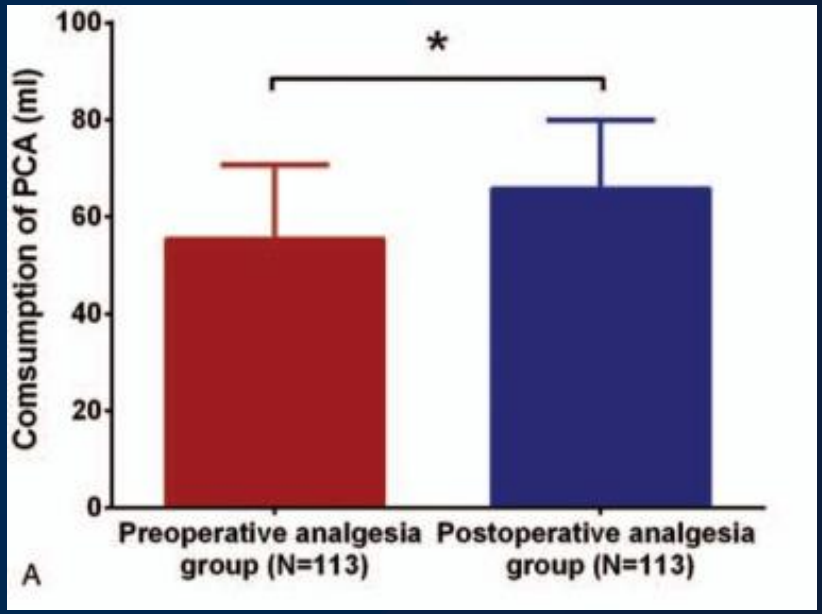
Pre-Emptive Celecoxib





Medicine (Baltimore). 2018 Dec; 97(51): e13663.

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Perioperative Anesthesia and Analgesia in Total Joint Arthroplasty Guidelines 2020

The Efficacy and Safety of Nonsteroidal Anti-Inflammatory Drugs in Total Joint Arthroplasty: Systematic Review and Direct Meta-Analysis

- Strong evidence: oral selective COX-2 or non-selective NSAID and intravenous ketorolac
- Prescribers need to remain vigilant when prescribing NSAIDs

J Arthroplasty. 2020 Oct;35(10):2739-2758.

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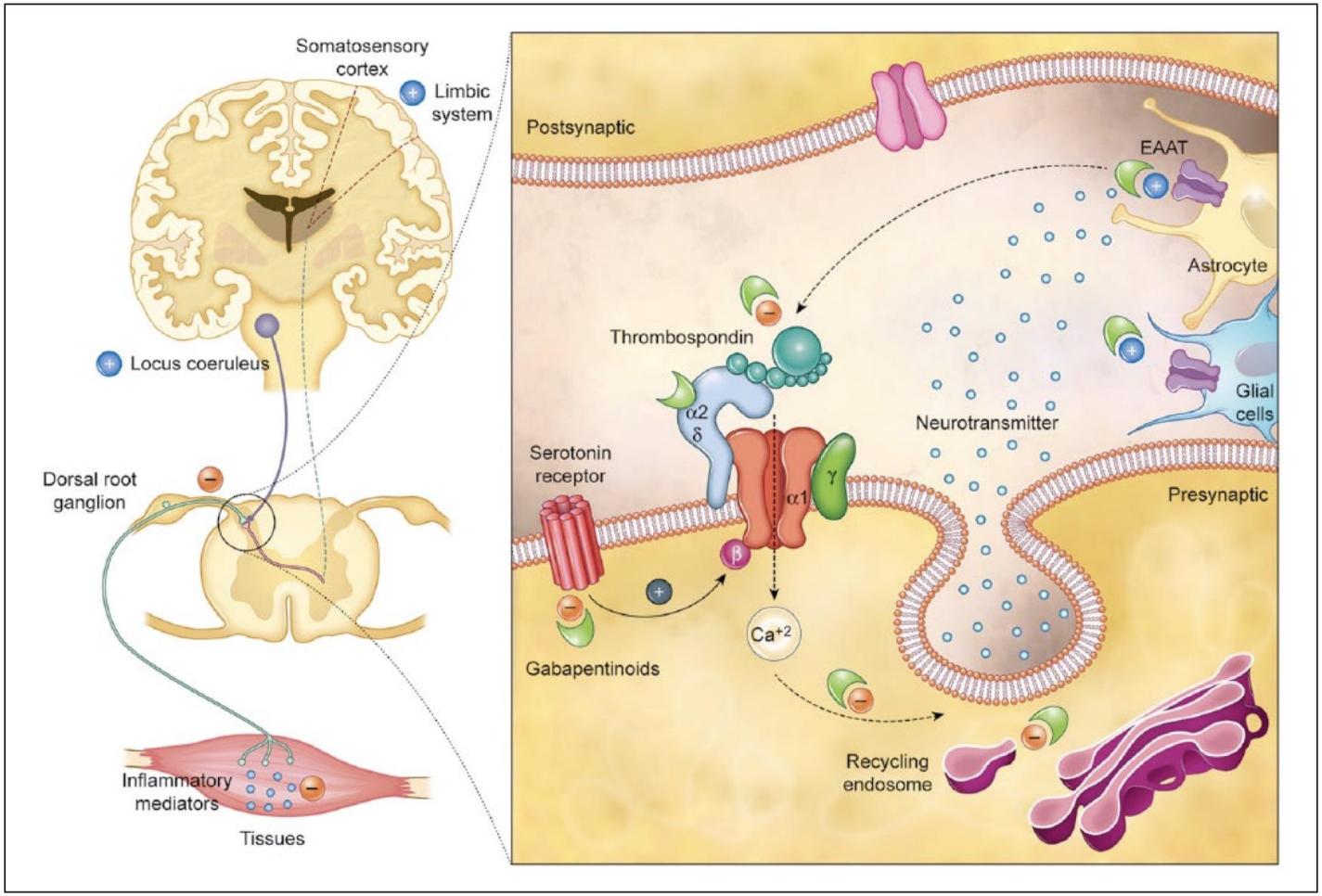
Gabapentinoids



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Perioperative Oral Pregabalin Reduces Chronic Pain After Total Knee Arthroplasty: A Prospective, Randomized, Controlled Trial

- Patients receiving pregabalin:
  - consumed less epidural opioids (p<.01)
  - consumed less oral opioid pain medication while hospitalized (p<.01)
  - had greater active flexion over the first 30 postoperative days (p= 0.01)
  - incidence of neuropathic pain was less frequent in the pregabalin group (0%) compared with the placebo group (8.7% and 5.2%) at 3 and 6 months, respectively pP< 0.01 and p= 0.01)

Anesth Analg . 2010 Jan 1;110(1):199-207.

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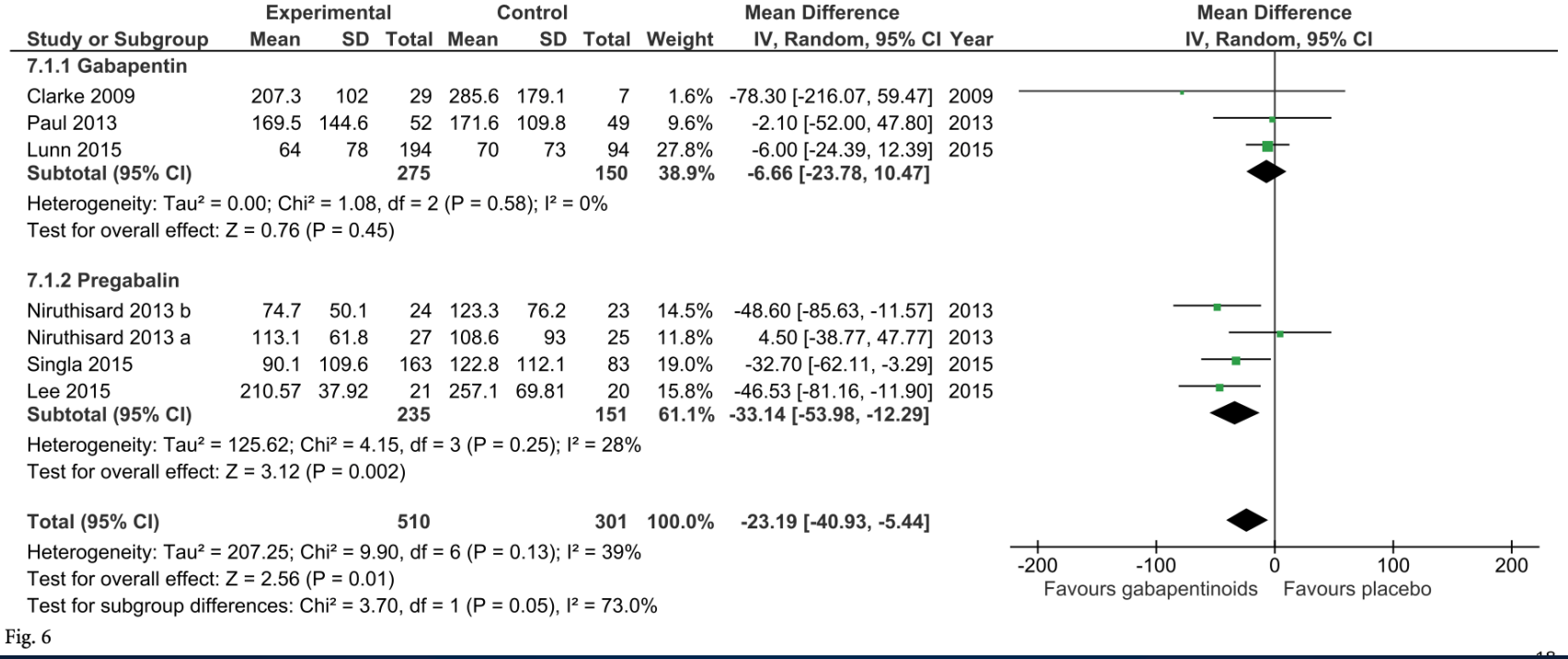
A Meta-Analysis on the Use of Gabapentinoids for the Treatment of Acute Postoperative Pain Following Total Knee Arthroplasty



Study or Subgroup	Experimental Mean	SD	Total	Control Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Year
7.1.1 Gabapentin									
Clarke 2009	207.3	102	29	285.6	179.1	7	1.6%	-78.30 [-216.07, 59.47]	2009
Paul 2013	169.5	144.6	52	171.6	109.8	49	9.6%	-2.10 [-52.00, 47.80]	2013
Lunn 2015	64	78	194	70	73	94	27.8%	-6.00 [-24.39, 12.39]	2015
Subtotal (95% CI)			**275**			**150**	**38.9%**	**-6.66 [-23.78, 10.47]**	
Heterogeneity: Tau² = 0.00; Chi² = 1.08, df = 2 (P = 0.58); I² = 0%									
Test for overall effect: Z = 0.76 (P = 0.45)									
7.1.2 Pregabalin									
Niruthisard 2013 b	74.7	50.1	24	123.3	76.2	23	14.5%	-48.60 [-85.63, -11.57]	2013
Niruthisard 2013 a	113.1	61.8	27	108.6	93	25	11.8%	4.50 [-38.77, 47.77]	2013
Singla 2015	90.1	109.6	163	122.8	112.1	83	19.0%	-32.70 [-62.11, -3.29]	2015
Lee 2015	210.57	37.92	21	257.1	69.81	20	15.8%	-46.53 [-81.16, -11.90]	2015
Subtotal (95% CI)			**235**			**151**	**61.1%**	**-33.14 [-53.98, -12.29]**	
Heterogeneity: Tau² = 125.62; Chi² = 4.15, df = 3 (P = 0.25); I² = 28%									
Test for overall effect: Z = 3.12 (P = 0.002)									
Total (95% CI)			**510**			**301**	**100.0%**	**-23.19 [-40.93, -5.44]**	
Heterogeneity: Tau² = 207.25; Chi² = 9.90, df = 6 (P = 0.13); I² = 39%									
Test for overall effect: Z = 2.56 (P = 0.01)									
Test for subgroup differences: Chi² = 3.70, df = 1 (P = 0.05), I² = 73.0%									

Fig. 6

"no evidence to support the routine use of gabapentinoids in the management of acute pain following total knee arthroplasty"

J Bone Joint Surg Am . 2016 Aug 17;98(16):1340-50.

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Perioperative Anesthesia and Analgesia in Total Joint Arthroplasty Guidelines 2020

The Efficacy and Safety of Gabapentinoids in Total Joint Arthroplasty: Systematic Review and Direct Meta-Analysis

- Moderate evidence supports pregabalin in TJA to reduce pain and opioid consumption
- Gabapentinoids may lead to an increased risk of sedation and respiratory depression

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Table 1

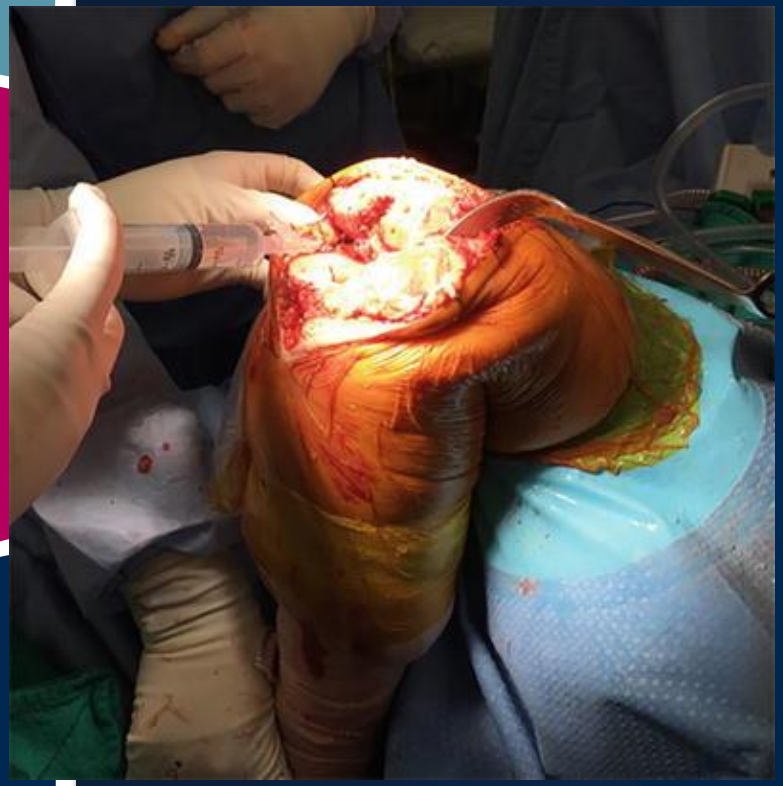
Dosage Recommendations for Individual Nonopioid Agents Administered as Part of Multimodal Analgesia

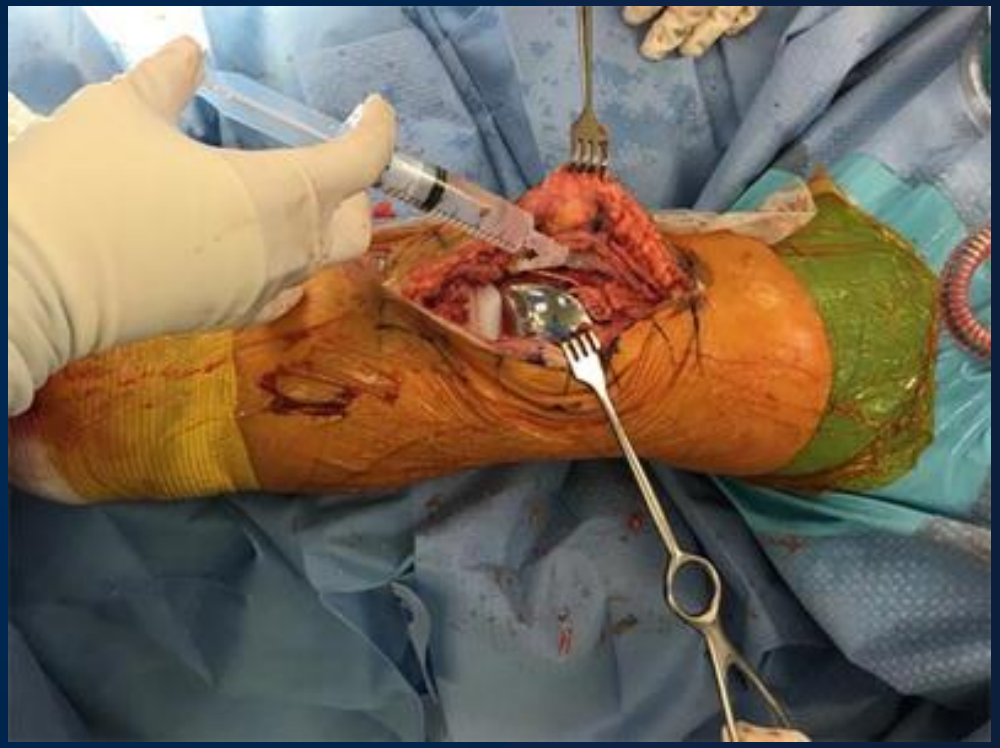
Drug	Dose	Route of Administration	Time Before Surgery	Time After Surgery
Ketorolac	15–30 mg	Oral/intravenous	1–2 h	15–30 mg/6 h
Ibuprofen	800 mg	Oral	1–2 h	800 mg/6 h
Celecoxib	400 mg	Oral	1–2 h	200 mg/12 h (12 h after surgery)
Gabapentin	300 mg	Oral	1–2 h	300 mg × 1 (24 h after surgery)
Pregabalin	75 mg	Oral	1–2 h	75 mg × 1 (12 h after surgery)
Propacetamol	2 g	Oral/intravenous	0–2 h	2 g/4 h
Acetaminophen	1 g	Oral/intravenous	0–2 h	650 mg/6 h

(Reproduced with permission from Parvizi J, Miller AG, Gandhi K: Multimodal pain management after total joint arthroplasty. *J Bone Joint Surg Am* 2011;93[11]:1075-1084.)

JAAOS 24(2):p 60-73, February 2016.

Local Infiltration Analgesia





https://aneskey.com/local-infiltration-analgesia-for-orthopedic-joint-surgery/

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Office tip

A state-of-the-art pain protocol for total knee replacement

David F. Dalury, MD

- Ropivicaine 5 mg/mL (49.25 mL)
- Ketorolac 30 mg/mL (1 mL)
- Epinephrine 1 mg/mL (0.5 mL)
- Clonidine 0.1 mg/mL (0.08 mg = 0.8 mL)
- Normal saline added to medications to total 100 mL

Arthroplasty Today. 2016 Mar; 2(1): 23–25.

Systematic Reviews and Meta-Analyses Associated with the Practice Guidelines of AAHKS, ASRA, AAOS, Hip Society and Knee Society

The Efficacy and Safety of Periarticular Injection in Total Joint Arthroplasty: A Direct Meta-Analysis

- Strong evidence supports the use of a PAI
- Adding a corticosteroid and/or ketorolac to a further reduces postoperative pain and may reduce opioid consumption
- Morphine has no additive effect
- Insufficient evidence on epinephrine and clonidine.

J Arthroplasty2022 Oct;37(10):1928-1938.e9.

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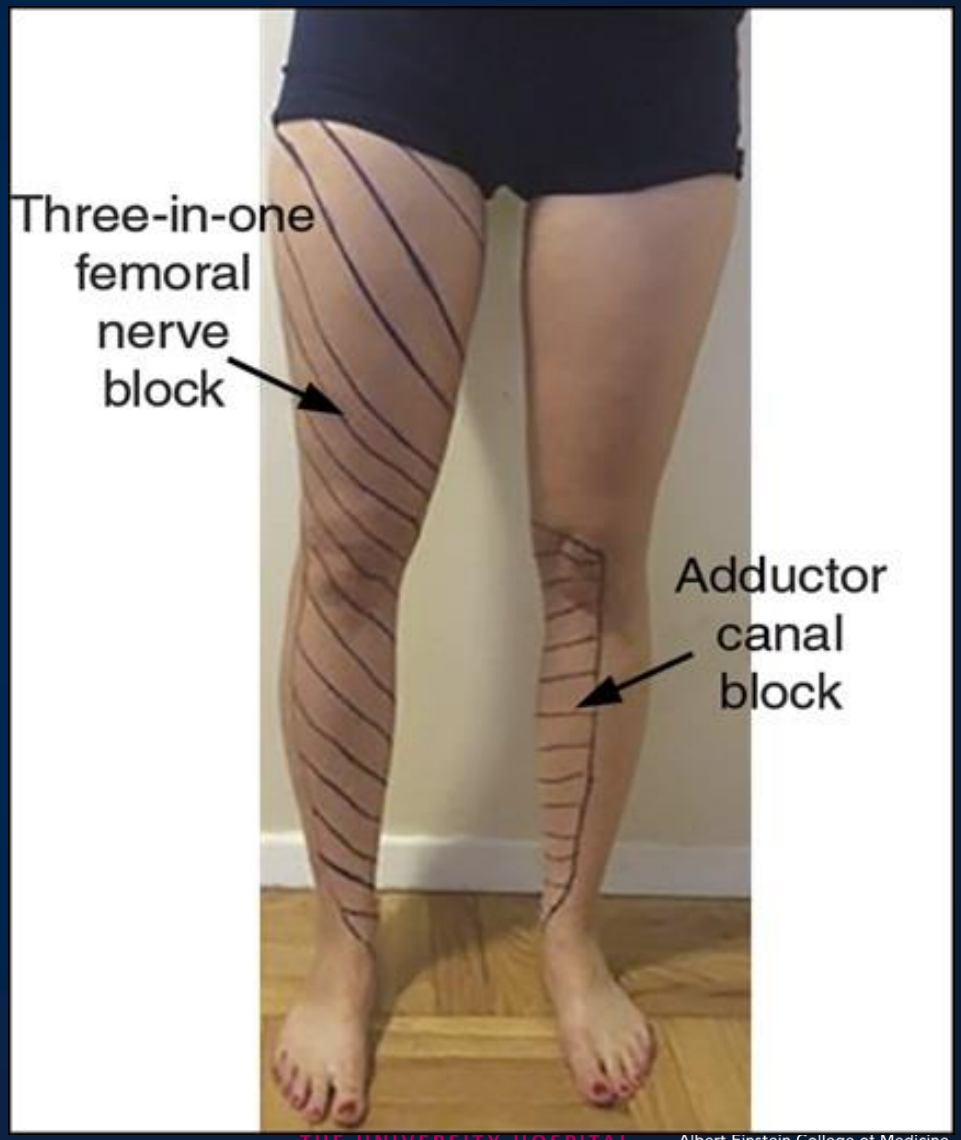
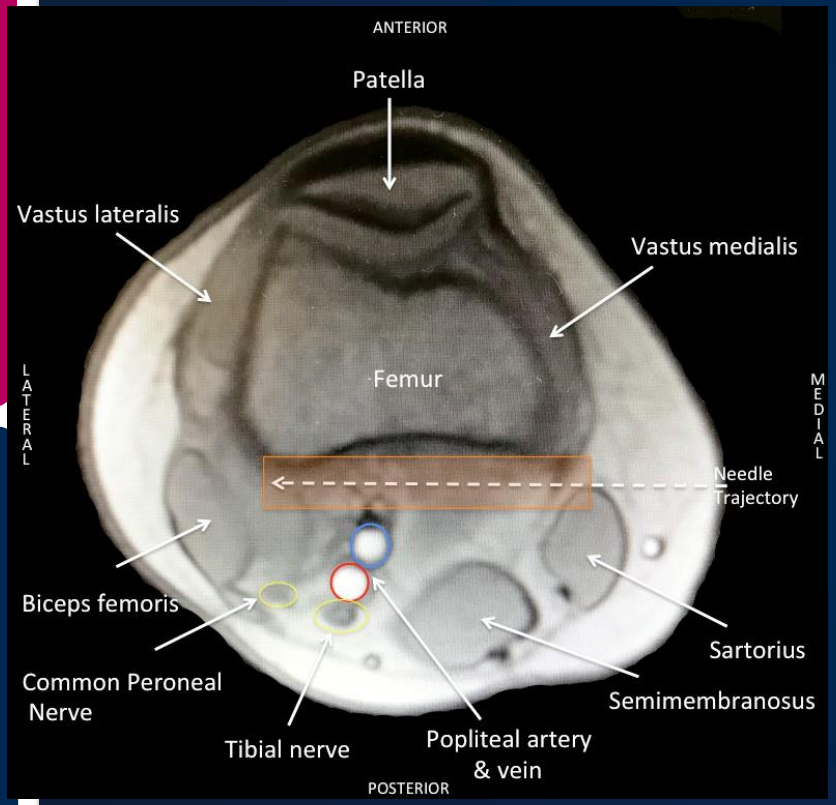
Peripheral Nerve Blocks

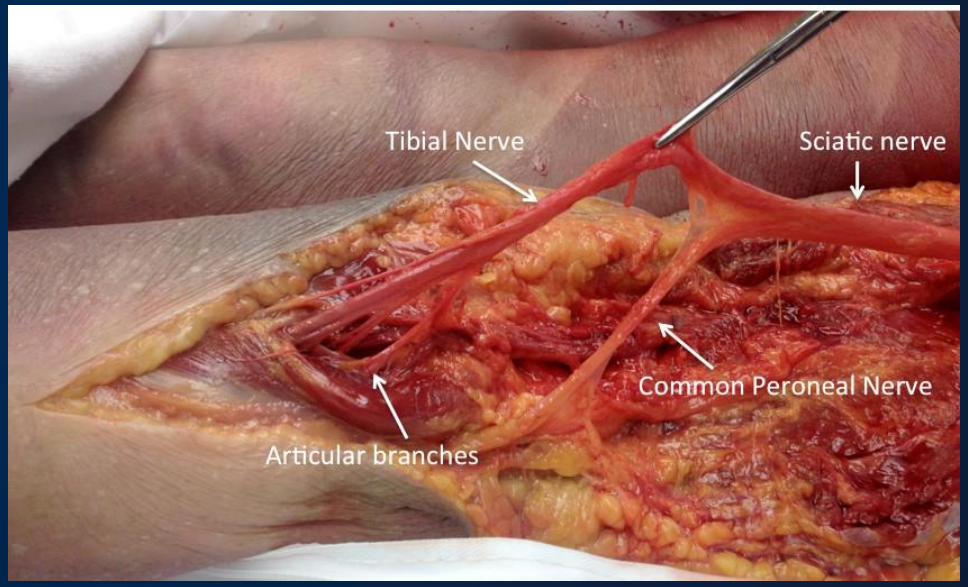
- Sciatic
- Femoral
- Adductor
- Tibial
- Posterior capsule
- Lateral geniculate



JAAOS 24(2):p 60-73, February 2016.

Infiltration between popliteal artery and capsule of the knee (iPACK)





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The Effect of the IPACK Block on Pain After Primary TKA: A Double-Blinded, Prospective, Randomized Trial

Matthew E. Patterson, MD [a, b], Jillian Vitter, MD [a], Kim Bland, MD [a], Bobby D. Nossaman, MD [a, b], Leslie C. Thomas, MD [a, b], George F. Chimento, MD [b, c, *]

The effect of continuous adductor canal block combined with distal interspace between the popliteal artery and capsule of the posterior knee block for total knee arthroplasty: a randomized, double-blind, controlled trial

Chun-Guang Wang[1*], Wen-hai Ma[2], Rui Liu[1], Ming-Yu Yang[1], Yang Yang[1] and Yan-Ling Ding[1]

Systematic Reviews and Meta-Analyses Associated with the Practice Guidelines of AAHKS, ASRA, AAOS, Hip Society and Knee Society

The Efficacy and Safety of Regional Nerve Blocks in Total Knee Arthroplasty: Systematic Review and Direct Meta-Analysis

J Arthroplasty . 2020 Jun;35(6S):S173-S177.
BMC Anesthesiol . 2022 Jun 6;22(1):175.
J Arthroplasty . 2022 Oct;37(10):1906-1921.e2.

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Intraop

- Neuraxial Anesthesia (Spinal or Epidural)
- Dexamethasone (Strong)
- Ketamine (Strong)

Post-op

- Acetaminophen (Standing)
- Gabapentinoid (Standing)
- NSAID (Standing)
- Opiate (Breakthrough)

2023 AAHKS Award Paper

The AAHKS Clinical Research Award: Extended Postoperative Oral Tranexamic Acid in Total Knee Arthroplasty: A Randomized Controlled Pilot Study

- Extended TXA group received an additional 1.95g oral TXA dose daily x 3 days
- Extended TXA patients:
  - increased knee flexion at 6 weeks (116.05 versus 106.5, P= .03)
  - improved VAS at 2 (2.5 versus 3.85, P=.04) and 6 weeks (1.35 versus 2.8, P=.01)
  - superior KOOS JR at 2 (66.87 versus 60.63, P =.03) and 6 weeks (73.33 versus 62.47, P< .01)

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Prolonged Post-op Pain

- Genicular Nerve Block + RFA
- Oral steroids

Can we get opioid free?

- Pre-emptive:
  - Oral Acetaminophen 975mg
  - Oral Pregabalin 75mg
- Adductor canal with IPACK and lateral geniculate block
- Neuraxial Anesthesia
- IV ketamine, ketorolac, dexamethasone
- Post-op:
  - Oral Acetaminophen
  - Oral Meloxicam 15mg
  - Oxycodone 5mg PRN

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Can we get opioid free?

Pre-op

- Patient assessment and development of pain management plan
- Patient and caregiver education

Intra-op

Post-op

- Track responses to treatment
- Adjust treatment plans
- Patient and caregiver education

Multi-modal analgesia

Perioperative Anesthesia and Analgesia in Total Joint Arthroplasty Guidelines 2020

The Efficacy and Safety of Opioids in Total Joint Arthroplasty: Systematic Review and Direct Meta-Analysis

https://alosahealth.org/wp-content/uploads/2022/11/UnAd_VascularSurgery_8.22_final.pdf

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Pain Management Post-TKA: Can we get Opioid Free?

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