

Reducing Postoperative Pain

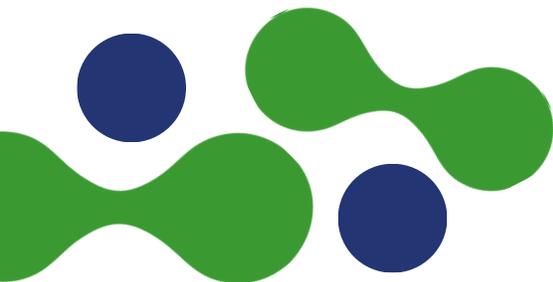
In canine orthopedic surgery, which analgesic modality reduces post-op opioid requirements the most?

- NSAIDs alone
- Epidural anesthesia
- Local nerve blocks
- Gabapentin

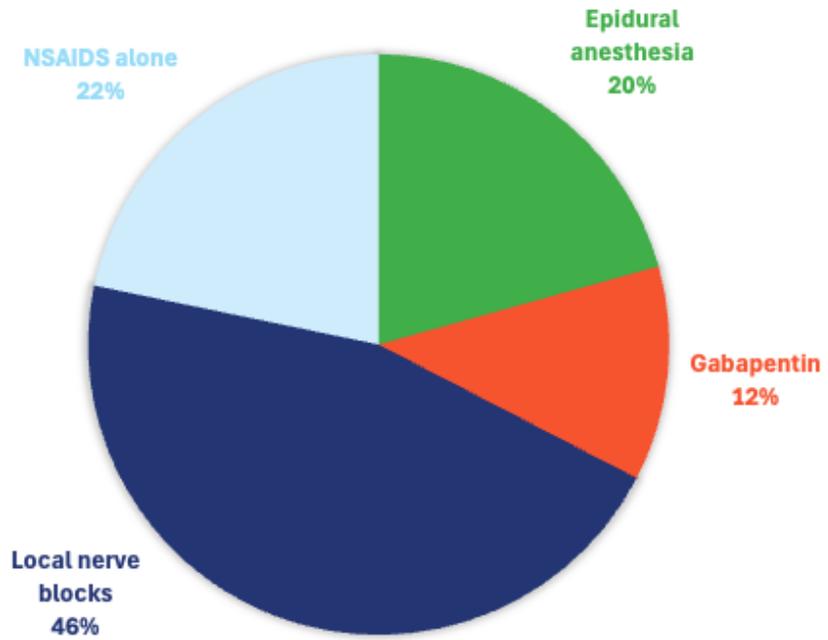
Specialist Corner

Across the four options provided, locoregional techniques (epidural anesthesia and peripheral/local nerve blocks) are the most consistently associated with marked postoperative opioid sparing in canine orthopedic surgery. When a single “best practice” modality must be selected in isolation, epidural anesthesia is commonly supported as a highly effective option for pelvic limb orthopedic procedures and is frequently characterized as a leading approach in veterinary anesthesia due to its segmental blockade and strong perioperative analgesia.

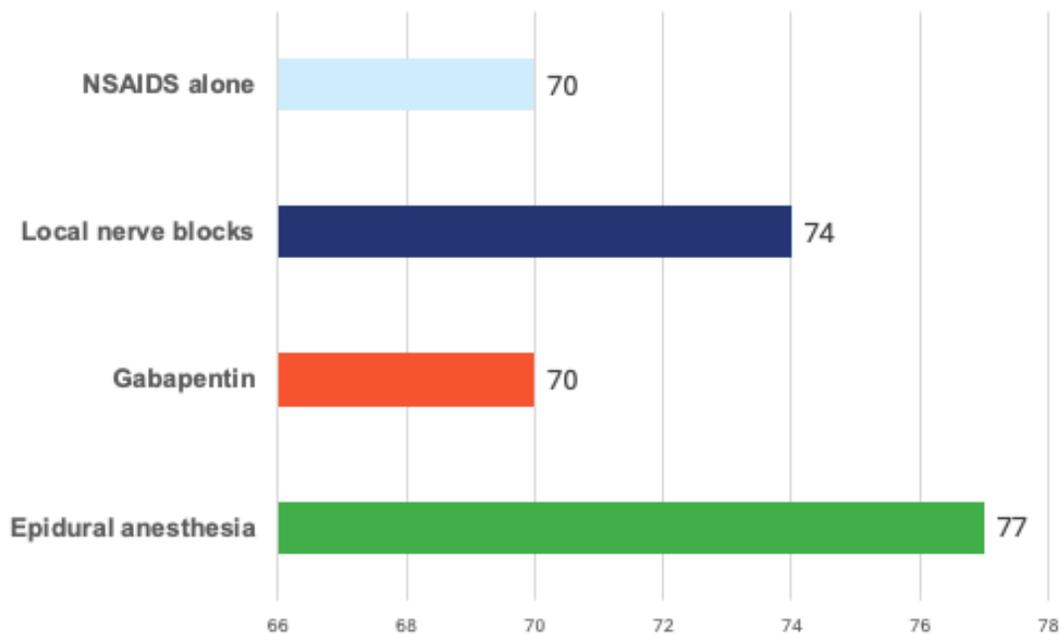
That said, modern comparative data indicate that femoral–sciatic (and similar) nerve block strategies can provide postoperative analgesia similar to epidural anesthesia for stifle procedures, meaning “best” often depends on local expertise, equipment, and patient-specific considerations rather than a universal hierarchy.



Survey responses showed that DVMs most commonly selected local nerve blocks as their primary analgesic strategy, followed by NSAIDs alone. In contrast, specialists more often favor epidural anesthesia as a regional technique to reduce perioperative opioid requirements.



Choice of Treatment



Effectiveness of Treatment

Modality review: mechanisms, outcomes, and real-world constraints

1) NSAIDs alone

Mechanistic role: NSAIDs reduce pain primarily by inhibiting cyclooxygenase pathways and lowering prostaglandin-mediated peripheral sensitization and inflammation. The AAHA guidelines highlight that NSAIDs expanded access to meaningful perioperative analgesia and remain a foundational therapy in postoperative settings.

Opioid-sparing expectation: NSAIDs are helpful and often reduce overall analgesic burden, but as monotherapy they typically do not blunt nociceptive transmission sufficiently for painful orthopedic procedures. As a result, opioid rescue requirements often remain significant compared with locoregional approaches.

Access/cost considerations: NSAIDs are usually the most accessible and affordable option, but contraindications (renal risk in hypovolemia/hypotension, GI ulceration risk, concurrent steroid use, certain hepatic concerns) can limit their use or require careful case selection.

Clinical positioning: NSAIDs should generally be viewed as a baseline component of multimodal analgesia rather than the primary opioid-sparing “workhorse” for orthopedic surgery when other tools are available.

2) Epidural anesthesia

Mechanistic role: Lumbosacral epidural administration of local anesthetic ± opioid provides segmental blockade of afferent nociceptive transmission at the spinal level, reducing central sensitization and thereby decreasing postoperative analgesic escalation. A prospective randomized blinded clinical study in dogs undergoing pelvic limb orthopedic surgery evaluated epidural morphine vs morphine-bupivacaine combinations for postoperative analgesia, illustrating the established clinical application of epidural opioid and local anesthetic combinations in orthopedic pain control.

Opioid-sparing expectation: Epidurals are frequently highly opioid-sparing because they can significantly reduce pain signaling and the need for systemic rescue. In clinical comparisons, epidural anesthesia has demonstrated improvements in postoperative analgesia versus systemic opioid strategies in certain settings.

Access/cost considerations:

- Training and comfort: Epidurals require technical proficiency and consistent sterile technique.
- Monitoring needs: Epidural local anesthetics can contribute to hypotension and motor blockade; opioid epidurals can contribute to urinary retention in some cases.
- Contraindications/limitations: Coagulopathy, infection at the site, severe sepsis, and some spinal abnormalities may preclude use or increase risk.

Clinical positioning: Epidural anesthesia remains a top-tier modality for pelvic limb orthopedic procedures and, in many hospitals, is the most realistic “high impact” opioid-sparing option when ultrasound-guided peripheral blocks are not consistently available.

3) Local / peripheral nerve blocks

Mechanistic role: Peripheral nerve blocks prevent action potential propagation along specific sensory pathways via sodium channel blockade, producing targeted analgesia to the surgical limb while minimizing global systemic drug effects.

Opioid-sparing expectation: Comparative evidence in dogs undergoing stifle joint surgery found that femoral and sciatic nerve blocks provided intraoperative antinociception and postoperative analgesia similar to epidural anesthesia. Additional clinical comparisons in pelvic limb procedures similarly report that epidural anesthesia and certain nerve block techniques can yield similar postoperative analgesia in real-world settings.

Access/cost considerations:

- Equipment: Ultrasound-guided regional anesthesia requires ultrasound access and trained staff; nerve-stimulator techniques may still require specific gear and experience.
- Consistency: Block failure rates and variable spread are real considerations without standardized technique and adequate repetition.
- Workflow: These techniques can be time-efficient once implemented, but early adoption often adds minutes and training overhead.

4) Gabapentin

Mechanistic role: Gabapentin modulates neurotransmission via binding the $\alpha 2\delta$ subunit of voltage-gated calcium channels and is commonly conceptualized as an adjunct for neuropathic pain modulation rather than a primary agent for acute surgical nociception.

Opioid-sparing expectation: Evidence for perioperative gabapentin in veterinary surgical pain is mixed. A study evaluating gabapentin in dogs undergoing TPLO reported that gabapentin (at the studied dose/frequency) did not improve subjective or objective perioperative pain outcomes. Earlier work in dogs in other surgical contexts (e.g., amputation) has investigated gabapentin as an adjunct within a broader analgesic regimen, but it does not consistently emerge as the strongest single “opioid-sparing” modality compared to locoregional anesthesia.

Access/cost considerations:

- Often inexpensive and widely available.
- Sedation/ataxia can be limiting, particularly combined with other CNS depressants.
- Owner adherence (q12h dosing, multiple days) can affect real-world utility.

Clinical positioning: Gabapentin may have a role as an adjunct in select patients, but it is generally not the primary strategy for meaningful opioid reduction after painful orthopedic procedures when locoregional techniques or NSAIDs are available



Practical best-practice recommendation (highest probability of positive outcomes)

For the highest level of consistent clinical outcomes in canine orthopedic surgery, the most evidence-aligned approach is multimodal analgesia with a locoregional foundation, supported by anti-inflammatory therapy when appropriate:

Anchor analgesia with a locoregional technique

- Epidural anesthesia (especially for pelvic limb procedures) remains a highly effective, opioid-sparing option with deep supporting literature.
- Peripheral nerve blocks (e.g., femoral–sciatic strategies for stifle surgery) provide comparable postoperative analgesia to epidurals in some controlled comparisons, and may be preferred when targeted unilateral limb analgesia and reduced systemic effects are priorities.

Layer NSAIDs when medically appropriate

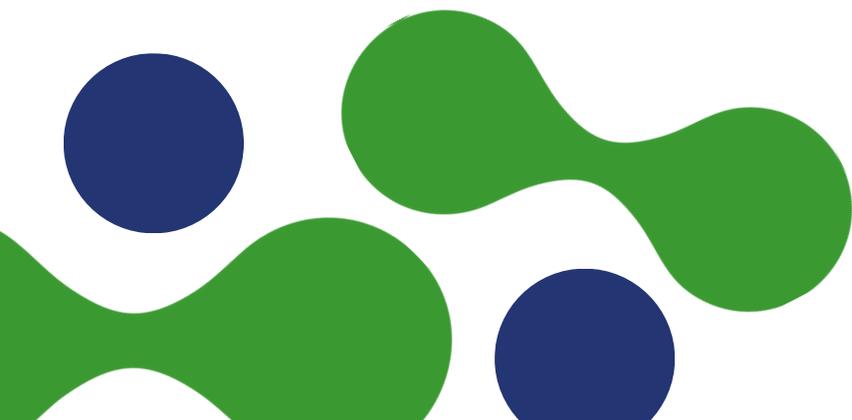
- NSAIDs remain a cornerstone of perioperative pain management and are emphasized in major guidance as a key therapeutic option in postoperative settings.

Use opioids as rescue/bridging, not as the primary plan

- With strong locoregional + anti-inflammatory analgesia, opioids can be reserved for rescue dosing, minimizing adverse effects while maintaining humane comfort.

Reserve gabapentin for specific adjunctive indications

- When neuropathic features are suspected or when constraints limit other modalities, gabapentin may be considered as part of a broader plan, recognizing that evidence for routine benefit after common orthopedic procedures like TPLO is limited in some studies.



Access and equity considerations

A “best practice” recommendation must acknowledge that real-world implementation varies:

- Hospital capability variance: Not all teams have ultrasound, anesthetic staffing, or regional anesthesia training. In these hospitals, epidural programs can sometimes be the most achievable high-impact upgrade because they require less capital equipment than ultrasound-guided blocks—but still require training and quality control.
- Client financial constraints: Locoregional techniques often add professional time and sometimes monitoring complexity. However, when executed efficiently, they can reduce downstream costs (shorter recovery distress, fewer rescue drugs, smoother discharge) and improve patient experience.
- Patient-specific constraints: Co-morbidities (coagulopathy, infection risk, hemodynamic instability) may eliminate epidurals or alter drug selection, in which case peripheral blocks—or a non-regional multimodal approach—may be more appropriate.

In summary, while epidurals and peripheral blocks represent the most opioid-sparing modalities among the listed options, the optimal choice in any hospital depends on training, equipment, patient factors, and client resources, with the best outcomes generally achieved by building a consistent multimodal protocol rather than relying on any single drug.

