香港獸醫專科服務

HONG KONG VETERINARY SPECIALTY SERVICES

Spinal fractures & luxations in dogs and cats

Quick take

Spinal fractures (broken vertebrae) and luxations (dislocated vertebrae) are most often caused by trauma (falls, being hit by a car, rough play). Because the spinal cord runs inside the vertebrae, these injuries can threaten movement, sensation, and bladder function. Many patients also have other injuries (chest, belly, limbs), so initial care focuses on stabilizing the whole patient, then the spine. When the spine is unstable and/or the cord is compressed, surgery to realign and rigidly stabilize the bones (and sometimes decompress the cord) gives the best chance for a safe recovery and long-term walking—especially if the pet still has deep pain sensation at the paws.

1) What's going on inside?

The spine is a column of bones (vertebrae) joined by discs and ligaments. Trauma can break a vertebra (fracture), shift it off its neighbour (luxation), or both.
These injuries can compress or stretch the spinal cord and nerves. The more the bones shift, the more the cord is at risk.

Damage location matters: neck (cervical), mid-back (thoracic), low-back (lumbar), or lumbosacral region. Thoracolumbar injuries are especially common in dogs and cats.

Neurologic status at arrival is the biggest prognostic clue. Pets who can feel a painful pinch at the toes ("deep pain") generally do better after stabilization than those who can't.

2) What you'll notice & how vets diagnose it

Common signs: sudden limb weakness or paralysis, wobbly gait, neck/back pain, reluctance to move, yelping on handling, knuckling of paws, changes in urination/defecation (leaking or not able to go).

Diagnosis: physical & neurologic exam, X-rays, and almost always CT (best for bone detail); MRI is added if we need to map spinal cord swelling/contusion or disc damage. Many patients have other injuries that must be stabilized first.

3) Treatment overview: cage rest vs surgery

A. Conservative (non-surgical) care—when it's reasonable

- Strict cage rest, pain control, bladder care, and frequent rechecks.
- Considered for **stable fractures/luxations** (little or no displacement; spine already "locks" in place), mild neurologic signs, or when anaesthesia is unsafe.
- **Drawbacks:** risk of late displacement, pressure sores, muscle loss, and slower return to function. Decisions are individualized; some stable injuries do well with rest alone.

B. Surgery—the mainstay for unstable or compressive injuries

Goals are to **realign** the vertebrae, **rigidly stabilize them** (so they can heal), and **decompress the spinal cord** if crushed by bone/disc. Multiple implant systems are used; your surgeon will tailor the plan to the fracture pattern, pet size, and anatomy.

4) Surgical options (what they are, when they're used, what to expect)

Most repairs are done through a carefully planned approach with fluoroscopy/CT guidance to avoid the spinal canal and maximize implant purchase.

A) Screws or pins + PMMA (bone cement)

What it is: Threaded screws or smooth pins are placed into the vertebral bodies above and below the break, then connected externally with PMMA cement to create a rigid "internal exoskeleton."
Why it's used: Works well across sizes and odd fracture patterns; allows custom angles and long spans.
Complications to know: Pin/screw loosening or infection is possible (usually uncommon with meticulous technique); longer-term issues reported in small series include implant irritation or need for removal/revision.

B) Plates (including "string-of-pearls" locking plates) or cuttable plates

What it is: Low-profile plates (often locking) contoured to the vertebrae and secured with screws; sometimes combined with PMMA.

Evidence: In 26 dogs and 2 cats treated for thoracic/lumbar fractures with SOP locking plates, overall complications were 28.6%; major and catastrophic complications were 3.6% each, and neuro status significantly improved from admission to discharge.
Case reports also describe veterinary cuttable plates reinforcing screw-and-PMMA repairs for challenging C2 fractures.

C) Pedicle screw–rod constructs

What it is: Small pedicle screws placed into the vertebral pedicles connected by rods—akin to human spinal fixation.

Where it fits: Useful in large dogs for robust fixation (more often used for lumbosacral instability, but also described for fractures/luxations). Biomechanical and clinical studies show strong stabilization at the operated level.

D)Tension-band techniques (selected avulsion patterns)

Used for specific bony avulsions (e.g., spinous processes) to convert distracting forces into compression; good outcomes reported in mixed dog/cat series.

E) Decompression (as needed)

If CT/MRI shows the cord is compressed by bone, disc, or hematoma, surgeons perform a hemilaminectomy/laminectomy or remove offending fragments during stabilization. (Decompression is adjunctive—stability remains the priority in fractures/luxations.)

5) What determines prognosis?

- **Deep pain sensation (DPP):** The single strongest predictor. In a classic 95-case review, dogs with DPP before surgery had a good chance of functional recovery; pets without DPP fare worse but can still improve in some cohorts.
- **How unstable** the spine is & how much the cord is compressed/contused (seen on CT/MRI).
- **Time to stabilization:** once the patient is stable overall, early fixation helps prevent ongoing cord damage from micromotion.
- **Concurrent injuries:** up to two-thirds of dogs with spinal fractures have other injuries needing care.

Encouragingly, a recent plate-stabilization series (dogs & cats) documented **significant neurologic improvement by discharge, with major/catastrophic complications ~3.6% each; DPP returned in ~86% of those arriving without it.** (Small cohort, but supports modern techniques.)

6) Complications & typical rates (what the literature reports)

Rates vary by injury severity, technique, and hospital. The numbers below give realistic ranges to discuss with your surgeon.

Overall surgical complications:

- With SOP locking plates for thoracolumbar injuries: 28.6% any complication; 3.6% major, 3.6% catastrophic (28 cases).
- **Mixed-technique reviews** (screws/pins + PMMA, plates, etc.) describe generally low intraoperative complication rates, with occasional implant problems requiring revision; details vary across case reports/series.
- **Implant-related issues (any system):** screw/pin loosening or migration, infection, or need for later removal—uncommon with careful planning and aftercare, but possible.
- **Neurologic non-improvement or decline:** most likely in pets that lacked DPP pre-op or had severe cord contusion/ischemia; some modern cohorts still show meaningful recovery even in initially DPP-negative animals.
- **Bladder/bowel problems:** spinal cord injury (SCI) can cause urinary retention or incontinence; with rehabilitation and time, 55–87% of dogs in published SCI cohorts regained continence after surgery/management, but some remain chronically affected. Urinary tract infections are a known risk in the early months after SCI.
- **Cats:** smaller datasets suggest that surgery gives better recovery for unstable fractures and more severe neuro deficits. Continence recovery in cats varies by lesion; tail-base sensation is a favorable sign in sacrocaudal injuries.

7) Life around surgery: what to expect

- **Before surgery**

Stabilize shock/bleeding, treat other injuries, give pain relief, and carefully move the patient as a “log” (no twisting). CT (± MRI) defines the plan.

- **The operation**

Under general anaesthesia, the team reduces (realigns) the bones and applies the chosen fixation; if needed, they decompress the cord. Many patients stand or toe-touch within days if they arrived with milder deficits; more severely affected pets improve over weeks to months.

- **Aftercare**

    - **Strict activity restriction** (usually 6–8+ weeks), incision care, and scheduled rechecks.
    - **Bladder management** (manual expression or meds) may be needed early. Owner guides stress that bladder routines and hygiene dramatically reduce UTIs and skin issues.
    - **Rehabilitation:** range-of-motion, assisted standing/ambulation, hydrotherapy when cleared.

8) Owner FAQ

- **Is surgery always needed?**

No. Truly stable injuries with mild signs can do well with strict rest and pain control. Unstable or compressive injuries are best served by surgery to prevent further cord damage and allow safe healing.

- **What are the chances my pet will walk again?**

It depends most on deep pain (DPP) at presentation. With DPP present, chances are good after stabilization. Without DPP, outcome is guarded, but modern series still report meaningful improvement for a subset. Your surgeon will grade your pet's status and discuss specifics.

- **Which fixation is "best"—cement, plates, or rods?**

There's no single winner for every fracture. Screws/pins + PMMA, locking plates (e.g., SOP), and pedicle screw–rod systems can all provide strong stability when matched to the fracture and the patient. What matters most is correct alignment, rigid fixation, and surgical expertise.

- **Will my pet be incontinent?**

Some are—temporarily or, in severe injuries, permanently. With time and rehab, over half of dogs in SCI cohorts regain continence; your team will teach bladder care and monitor for UTIs.

- **Who should be operating on my dog with a broken spine?**

Such surgeries are complex and investigation requires some options for advanced imaging. This will narrow down the number of hospitals where the procedure can be done. Access to CT scan or MRI scan is needed. An experienced surgeon (board-certified) or neurologist are usually recommended to handle such cases.

9) Practical tips for caregivers

- Handle like a log. Keep the spine aligned during transport (use a board/blanket).
- Watch for pain and bladder issues. Failure to urinate, constant leakage, foul urine odour, fever, or straining warrants a prompt check.
- Think long-game. Weight control, controlled exercise, and home traction (rugs, booties) protect recovery.
- Ask your surgeon:
    a. Why is my pet's injury considered stable or unstable?
    b. Which fixation method fits this fracture, and what are your service's complication rates?
    c. What's our plan for bladder care and rehab?

10) Selected references (owner-friendly summaries & key studies)

- Bruce/Brisson et al., 2008. Spinal fractures/luxations in dogs & cats—95 cases. DPP at presentation predicted functional recovery; overall outcomes with appropriate management were favourable.

- Ciou et al., 2024. Thoracic/lumbar fractures & luxations stabilized with SOP locking plates (26 dogs, 2 cats). 28.6% any complication; 3.6% major; 3.6% catastrophic; significant neuro improvement; ~86% regained DPP when absent initially.
- Letesson et al., 2022. Long-term follow-up after unilateral 2.0 UniLock stabilization (8 dogs, 2 cats): satisfactory long-term function.
- Bagley, 2000. Clinical review of surgical vs conservative management of vertebral fractures/luxations—framework still used today.
- Cabassu, 2005; Diamante, 2020. Overviews of complications with spinal fixation (including pins/screws + PMMA): infection/loosening are the main concerns; rates vary by case and technique.
- Zindl et al., 2018; Tellegen et al., 2015. Pedicle screw–rod fixation reduces motion at the operated level; feasible clinical option in large dogs when indicated.
- Gernone et al., 2022; Granger et al., 2020. Bladder/bowel issues after SCI—mechanisms and practical management; continence recovery often possible.
- Palus/Orgonikova et al., 2021. Two-part clinical review on small-animal vertebral fractures/luxations—evaluation, prognosis, and surgical decision-making.

Bottom line

- Unstable spinal fractures/luxations (or those compressing the cord) are best treated with surgery to realign and rigidly stabilize the spine (± decompress).
- Deep pain at presentation is the most powerful predictor of walking again; nevertheless, many pets improve after modern stabilization—even some that arrive worse off.
- Complication rates depend on technique and severity; recent plate-stabilization data show major and catastrophic complications around 3–4% per category, with overall complications ~29% (mostly minor/manageable).
- Expect strict rest, bladder care, and rehab—and remember that many dogs and cats regain comfortable mobility and a good quality of life with thoughtful, timely care.
- Advanced imaging options: CT scan can already provide excellent visualization of the fracture configuration. Whenever deep pain perception is absent, MRI scan might provide an additional useful information.
- Such surgeries are complex and require a specific equipment. Prognosis is highly dependent on expertise. A board-certified specialist in surgery or neurology will be needed in most cases.