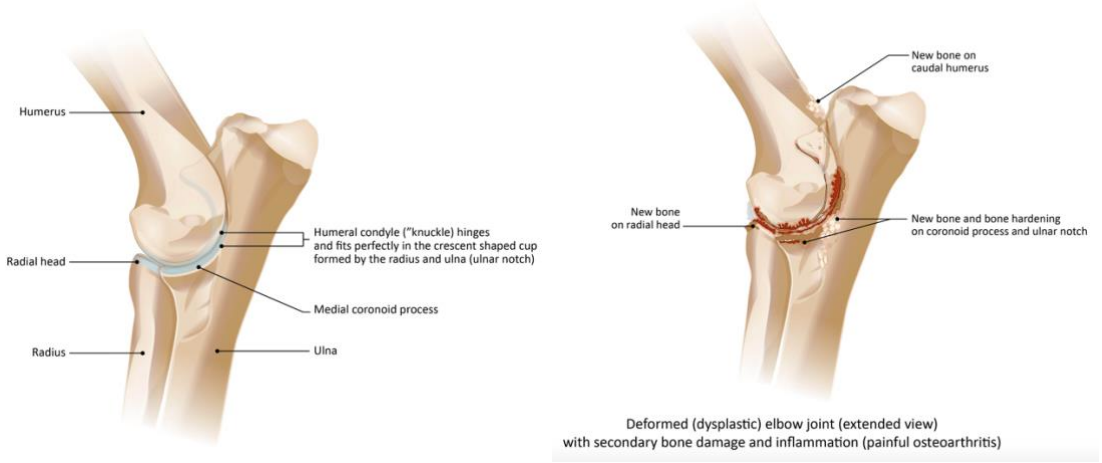
香港獸醫專科服務

HONG KONG VETERINARY SPECIALTY SERVICES

Elbow dysplasia in dogs

Quick take

"Elbow dysplasia" isn't one single problem—it's an umbrella term for several developmental conditions that injure the cartilage and bone inside the elbow.
The **big four** are: medial coronoid disease (often called FMCP/FCP), ununited anconeal process (UAP), osteochondritis dissecans (OCD) of the humeral trochlea, and elbow incongruity (the joint surfaces don't fit perfectly).
These issues create **pain, lameness, and—over time—osteoarthritis** (OA).
Many dogs improve with weight control and pain management, but surgery is often recommended to remove loose bone/cartilage, restore joint mechanics, and slow OA.



1) Pathophysiology: what's going on inside?

- **Genetics + rapid growth + loads on the joint** : Large and giant breeds grow fast; if the three elbow bones (humerus, radius, ulna) don't grow in perfect sync, abnormal forces concentrate on the medial coronoid process (ulna) and medial humeral condyle. That stress can crack the coronoid (fragmentation), soften/damage cartilage (OCD), or keep the anconeal process from fusing to the ulna (UAP).

The cycle: micro-injury → inflammation → cartilage wear → Osteoarthritis.

- **Medial coronoid disease (MCD/FMCP):** The most common ED subtype. The coronoid can fissure or fragment; sometimes the problem is diffuse cartilage/bone disease without a big fragment. Dogs show front-leg lameness worse after exercise/rest.

- **Ununited anconeal process (UAP):** A growth-plate failure at the tip of the ulna that should fuse by ~5 months. Classic in young German Shepherd Dogs; the loose anconeal piece painfully impinges in the joint.

- **OCD of the elbow:** A flap/defect forms in the cartilage of the medial humeral trochlea; the flap can detach and irritate the joint.

- **Incongruity:** If radius/ulna lengths or shapes don't match the humerus, contact pressures spike medially, accelerating cartilage damage. Correcting incongruity (usually by carefully planned ulnar osteotomy) can redistribute load.

2) What owners notice & how vets diagnose it

Common signs:

- front-leg lameness (often both elbows),
- stiffness after rest, "bunny-hopping" or short-stepping,
- reluctance to jump,
- elbow held slightly outward,
- muscle loss over shoulder.
- Young dogs (5–12 months) often present, but adults with chronic OA do too.

Diagnosis:

- Exam + x-rays to screen (look for UAP, OCD lesions, sclerosis, osteophytes): **Poor sensitivity to detect mild changes that could still have a major effect on the cartilage in the future. Only reliable to detect a major misalignment of the joints or advanced OA in adults; More sensitive for OCD lesions.**
- CT is excellent for coronoid disease and the most sensitive non-invasive option to investigate and detect disease at a young age.
- Arthroscopy both confirms the diagnosis and allows treatment.
- Some cases need advanced planning images for corrective osteotomies: CT scan is again the best modality in such cases.

3) Treatment overview: conservative vs. surgical

- **Conservative care**
  - Not a primary option if the condition is picked up at an early stage. The surgery at a young age can significantly improve the control of the clinical signs and slow/prevent the development of the degenerative osteoarthritis. Surgery at a late stage will only help control some of the pain and is not as rewarding.
  - Lean body weight, controlled low-impact exercise, joint-friendly surfaces.
  - Analgesia (NSAIDs as prescribed), joint injections in selected cases, and rehab/physiotherapy.
  - This helps control pain but doesn't remove fragments or fix incongruity.
  - Your vet may recommend surgery when pain persists or imaging shows surgically addressable disease.
- **Why surgery?**
  - Arthroscopy allows a minimally invasive look and treatment: remove loose fragments/flaps, debride damaged cartilage, assess the rest of the joint.
  - Corrective osteotomies change joint mechanics (e.g., unload the damaged medial compartment or correct radius/ulna mismatch).
  - Fixation procedures can salvage growth-plate problems (e.g., UAP). The goals are better comfort/function now and slower OA later.
  - Surgery is best to perform at a young age as the long-term benefits are proven when disease is treated before the OA develops.

4) Surgical options by condition (what they do, when they're used, expected results)

A) Medial coronoid disease (FMCP/MCD)

1) Arthroscopy (fragment removal / subtotal coronoidectomy ± microfracture)

What it is: Keyhole surgery to remove cracked/loose coronoid material and smooth the joint. Recovery is quick, patients can be discharged on the same day.

How dogs do:
Owner-reported long-term outcomes after arthroscopic treatment of elbow OCD (often with concurrent MCD) were excellent or good in ~94% (67% excellent, 27% good) in one 2012–2020 series; lameness persisted in a minority.

Limits: Arthroscopy treats the result (damaged tissue) but not always the cause (abnormal load). That's why some dogs need a **load-modifying surgery** (below) if pain persists or cartilage loss is advanced. Also, not all studies find superior mobility vs conservative care, underscoring how case selection matters

2) Load-modifying osteotomies for medial compartment disease (advanced medial wear)
When the medial side is badly worn ("medial compartment disease", MCD), surgeons may shift load away from the damaged side:

- **PAUL:** Proximal Abducting Ulnar Osteotomy (with plate fixation). Tilts the ulna to offload the medial compartment. Outcomes: short-/long-term series report improved comfort and function; major complications around 12% in one 33-elbow cohort (delayed union, implant issues). Larger retrospective cohorts found complications fairly common, especially in heavy dogs; one study of 74 cases reported ~25% major complications (non-union, implant failure, infection).

- **SHO:** Sliding Humeral Osteotomy. Moves the humeral shaft laterally to unload the medial compartment. Mid- to long-term studies show meaningful improvement for many dogs, but reported complication rates vary by technique/centre—from ~0–4% minor with a modified approach to ~17–34% requiring revision in other series. Owner improvement was reported by ~90% in one long-term cohort; 6/… dogs in that series needed re-operation.

- **Dynamic ulnar osteotomies (DUO / BODPUO).** Carefully planned cuts in the ulna to improve joint congruity and load sharing in younger dogs with early MCD. A prospective comparative study (DUO vs BODPUO vs conservative) found surgically treated dogs had lower lameness and pain scores at 12–24 months, supporting the value of early mechanical correction. (OA still progresses over time—just more slowly.)

3) Resurfacing or replacement (for end-stage medial disease)

- **CUE (Canine Unicompartmental Elbow resurfacing)**. Metal/polymer resurfacing of just the medial compartment. In initial multicenter reports, complications were roughly 1% catastrophic, ~11% major, ~27% minor; many dogs achieved acceptable to full function. (Results vary with case selection and surgeon experience.)

- **Total Elbow Replacement (TER, e.g., TATE).** For global end-stage OA in carefully selected dogs. Historically high complication and failure rates limited

adoption; newer approaches aim to lower this, but even recent reviews still advise caution and specialist referral. HKVSS is not currently performing this procedure and no other Specialist care centre in Hong Kong seems to be performing it at this stage.

B) Ununited anconeal process (UAP)

Why it happens: The anconeal process fails to fuse to the ulna, typically in young, large breeds (classically German Shepherd Dogs). The loose piece hurts and destabilizes the joint.

Surgical strategies:

- Lag-screw fixation of the anconeal fragment often combined with a proximal ulnar osteotomy to reduce shear forces and allow healing. Small series report excellent fusion and limb function when performed early. Newer CT-guided techniques are being explored too.
- Fragment removal (excision) is used if the fragment is small/degenerate or presented late—often palliative with OA management thereafter.
- **Results:** Multiple cohorts report **good–excellent outcomes** and fusion when fixation + ulnar osteotomy is done at the right age; one older series reported **>80% clinically normal elbows** long-term.

C) Osteochondritis dissecans (OCD) of the elbow (medial humeral trochlea)

What surgery does: Arthroscopy removes the flap/loose body and treats the defect bed (microfracture to stimulate fibrocartilage or, in select centres, osteochondral grafting for larger defects).

Outcomes: Long-term arthroscopic series report excellent or good results in ~94% of elbows; persistent mild lameness in a minority. Small case series on osteochondral allograft/autograft show promising function with low reported complications in highly selected cases.

5) What to expect around surgery

- **Pre-op:** confirm the subtype(s) of elbow dysplasia with imaging; discuss weight, rehab, and your goals (pain relief vs return to sport). Bilateral disease is common, so your surgeon may stage procedures.
- **Anesthesia & procedure:**
  - Arthroscopy uses tiny portals; most dogs go home the same day or next.
  - Osteotomies (PAUL/SHO/DUO/BODPUO) involve bone cuts and plates/pins; expect restricted activity and rechecks until bone heals.
  - CUE/TER are specialist implants with longer recoveries and more intensive aftercare.
- **Rehab:** Controlled leash walks, range-of-motion work, and gradual strengthening—your team will tailor a plan; keeping your dog lean is non-negotiable for outcomes.

6) Complications: what can happen and how often

Rates vary by hospital, technique, and how “minor” vs “major” is defined. The ranges below come from peer-reviewed veterinary studies to guide realistic expectations.

- **Arthroscopy (diagnostic ± fragment removal)**
  Minor peri-op issues: about 17% (e.g., brief swelling, minor portal problems).
  Major complications: about 5% (e.g., need to convert to open surgery, unplanned repeat surgery). Overall, elective elbow arthroscopy is considered low-risk in experienced hands.

- **PAUL (proximal abducting ulnar osteotomy)**
  Complications overall: vary by study and bodyweight. A 33-elbow series reported ~12% major complications (delayed union, screw migration/instability). Another cohort (74 elbows) reported ~25% major complications, with higher odds in heavier dogs; non-union and implant failure were the main issues.

- **SHO (sliding humeral osteotomy)**
  Complications: reports range widely with technique/experience—~0–4% minor using a modified method in one study, but ~17–34% (often needing revision) in others. Typical problems include implant failure, delayed union, or surgical-site complications. Owner-perceived improvement was ~90% in one prospective cohort despite ~17% requiring re-operation.

- **DUO / BODPUO (dynamic ulnar osteotomies)**
  Outcomes/risks: In a prospective comparison, surgery (either DUO or BODPUO) led to less lameness and elbow pain at 12–24 months vs conservative care; OA still progresses over time. Reported complications are centre-dependent; your surgeon can share their service's numbers.

- **CUE (unicompartmental resurfacing)**
  Complications (initial multi-centre series): ~1% catastrophic, ~10–11% major, ~27% minor. Many dogs achieved acceptable or full function by surgeon assessment and improved owner pain scores. Case selection and implant positioning are important for success.

- **Total elbow replacement (TER, e.g., TATE)**
  Historically high complication rates limited wide use (older systems often ~20–25% or more); alignment and implant issues have been reported. Some newer iterations aim to reduce complications, but TER remains specialist-only and for carefully selected, end-stage cases. Ask for center-specific outcomes.

7) Prognosis: what improves—and what may persist?

Near-term: After fragment removal or corrective osteotomy, most dogs show less lameness and better comfort within weeks to months as bone/soft tissues heal. Owners commonly report meaningful improvement in activity and willingness to play.

Long-term: Because ED is developmental, OA typically progresses to some degree no matter what—your aim is to slow it and keep pain controlled. **Early, well-matched surgery** + lifelong weight control and sensible exercise usually deliver the best quality-of-life curve.

End-stage options: For severe medial compartment disease unresponsive to simpler surgeries, CUE or SHO/PAUL can provide durable relief for many; total replacement is a last resort at specialized centres.

Biggest mistake of a pet owner is to use some anti-inflammatory drug to treat an initial episode of lameness at a young age without seeing a specialist for investigation at that stage. Typically elbow dysplasia will cause a first episode of pain (exercise intolerance, head dropping on the good limb) and then can turn silent for a couple of years. Pain will respond to this first course of anti-inflammatory drugs, however you will have missed a chance to keep this condition totally silent in the long-term. Ultimately, the conservative approach will fail and osteoarthritis will already have progressed too much to be controlled.

8) Choosing among surgeries (how teams decide)

- Confirm the subtype(s) (MCD vs UAP vs OCD vs incongruity) with imaging/arthroscopy.
- Address fragments/flaps first (arthroscopy). If cartilage loss is advanced or mechanics are poor, add a load-modifying osteotomy (PAUL/SHO) or dynamic ulnar osteotomy (DUO/BODPUO)—especially in young dogs with incongruity.
- Reserve implants (CUE or total elbow) for end-stage cases after careful counselling about risks, rehab, and expectations.

9) Owner checklist: set your dog up for success

- **Investigate and treat the first onset of lameness** when still growing. Most owner will detect the lameness at an age where minimally-invasive surgery (arthroscopy) could have made the most meaningful long-term impact and potentially could have totally prevented development of osteoarthritis long-term. Initial response to NSAIDs inevitably mislead them and get them to look the other way.
- Keep them lean. Even a small weight loss lessens elbow load and pain. Lifelong weight vigilance is the #1 “medicine”.
- Plan rehab. Controlled walks, strength/posture work, and home-surface tweaks (rugs, ramps) matter. Use the expertise of a physical therapist to demonstrate and help you maintain the mobility of the joints.
- Ask about your surgeon’s numbers. What are their complication and success rates for PAUL/SHO/DUO/CUE? Local experience matters as much as published averages.
- Think long game. Even after successful surgery, expect OA care (exercise plan, anti-inflammatories as needed, joint injections in select cases) through adulthood.

10) Typical questions

- **“Will surgery cure elbow dysplasia?”**
  It treats the mechanical problems and reduces pain, but ED is developmental—most dogs still develop some OA over time. The goal is better comfort and function long-term. The closer to a cure is achieved with early treatment.
- **“Which is better—arthroscopy or conservative care?”**
  For obvious fragments/OCD, arthroscopy usually helps quickly and safely. For diffuse MCD or established OA, results vary—some studies show little difference vs conservative care—so your surgeon will weigh age, lesion type, cartilage status, and your goals before recommending load-modifying surgery.
- **“Is SHO or PAUL safer?”**
  Both can work; complication profiles differ among studies and depend on technique and bodyweight. Published major-complication rates have ranged from ~0–4% (modified SHO series) to ~17–34% in other SHO reports, and ~12–25% for PAUL across cohorts. Your surgeon’s personal outcomes are most relevant.
- **“What about elbow replacement?”**
  CUE can help medial-only end-stage disease with complication rates around ~11% major, ~27% minor in early reports. Total elbow replacements remain specialist-only due to historically high complication rates; newer designs are evolving but are not first-line.

11) Selected veterinary references (English; owner-friendly + key studies)

- ACVS: Canine Elbow Dysplasia (client guide). Anatomy, subtypes, signs, and treatments.
- Arthroscopy risks (elective): Minor ~17%, major ~5% short-term in a retrospective study.
- Arthroscopy owner outcomes (OCD ± MCD): ~94% excellent/good at long-term follow-up.
- MCD: Conservative vs arthroscopic evidence discussion (Veterinary Evidence). Highlights ongoing debate and importance of case selection.
- DUO/BODPUO vs conservative: Prospective study—surgery improved lameness/pain at 12–24 months.
- PAUL: Major complications ~12% in a 33-elbow cohort; heavier dogs at higher risk and up to ~25% major complications in another cohort.
- SHO: Complications variable—modified technique with ~0–4% minor in one study; other series report ~17–34% (often needing revision) but strong owner-reported improvement overall.
- UAP fixation + proximal ulnar osteotomy: Small series with excellent fusion and function when treated early; newer CT-guided screw techniques described.
- CUE (unicompartmental resurfacing): Catastrophic ~1%, major ~11%, minor ~27% in the initial multicentre report; many dogs acceptable/full function.
- Total Elbow Replacement (TATE and others): Historically high complication rates; alignment and implant concerns; specialist referral only.

12) Bottom line for dog owners

- Early diagnosis and treatment and keeping your dog lean are the two most powerful things you can do.
- Arthroscopy is low-risk and helpful for many elbows with fragments or OCD, but mechanical load often needs attention too.
- For advanced medial wear (MCD), PAUL or SHO can offload the damaged side—effective for many dogs, but complication rates are higher than for arthroscopy and vary with bodyweight and surgeon experience.
- CUE is an option for end-stage medial disease; total elbow replacement is a last resort at specialized centres.
- No matter the path, plan for a lifelong OA strategy (weight, activity plan, analgesia/rehab as needed). With a thoughtful plan and realistic expectations, most dogs enjoy significantly better comfort and activity after well-chosen surgery.