

Owner's Guide To Canine Elbow Dysplasia

By Allyssa Mader

Foreward

On December 5, 2006, my first Golden Retriever was born... Olly. Eight weeks later he barged into our home and our hearts and ruled both until the day he died, one month short of his twelfth birthday. Sadly, after intermittent lameness starting at about five months old, Olly was diagnosed with bi-lateral elbow dysplasia (fragmented coronoid process) at about eight months old. Despite my very best efforts, the recommendations I received and the subsequent surgeries and procedures performed on Olly were not ideal, based on the information I have today. His surgeries did nothing to improve the elbow joint congruity or reduce or the load on the damaged portion of the joint. He suffered as a result and lived his remaining eleven years crippled with progressively more arthritic and painful joints. Olly was tough as nails though, and despite those terrible elbow joints, he was determined to live a full life, even going for a short walk and swim in the pool on the day he passed away from cancer.

Exactly ten years and ten days later, on December 15, 2016, my third Golden Retriever was born. I named him Goose. Goose came from a litter I carefully selected after much research into the pedigrees on both sides. His parents had all of the required health clearances for Golden Retrievers, including Orthopedic Foundation for Animals (OFA) screened "normal" elbows. I had high hopes for Goose's future, intending to show him in American Kennel Club (AKC) conformation and possibly compete with him in other dog sports. Unfortunately, Goose began limping at five months old, and was diagnosed with elbow dysplasia (also fragmented coronoid process) via CT scan at six months old. Due to my previous experience with Olly, I knew what to do and exactly where to take Goose for the best possible care for his elbows. He had early surgery (bi-lateral proximal ulnar osteotomy and bi-lateral arthroscopic subtotal coronoid ostectomy), and overall has done quite well, especially compared to Olly.

Although I was disappointed by Goose's diagnosis, I also feel quite lucky. All of the experience and knowledge I gained with Olly directly benefited Goose. I knew what to look for, where to go, what the surgical options were, what questions to ask, what happens as dysplastic dogs age, and what complementary therapies to pursue. This allowed me to navigate the process with Goose more easily, and as a result Goose had much more aggressive surgery, much earlier, and will hopefully lead a more comfortable life as a result.

And so, I wrote this owner's guide to elbow dysplasia in Olly's honor. It contains everything about elbow dysplasia that I wish I had known twelve years ago. Some of it I learned as a result of making the wrong decisions for Olly. And some of it I have learned in the last few years with Goose. I hope sharing this information through my lens as a dog owner will give people more knowledge to help make educated choices for their dogs, as well as an idea of what to expect in dealing with the reality of elbow dysplasia over the course of a dog's life.

Keep in mind, all the treatments outlined in this guide – surgical, medical, nutraceutical, etc., – are simply options. You can choose among them, and none are required for your dog's survival. If financial, health, or access to qualified orthopedists eliminate any or all surgery as an option, your dog can still have a good quality of life. In fact, surgery does not guarantee an

improved quality of life, all dogs with elbow dysplasia will go on to develop some degree of osteoarthritis in their elbows.

Disclaimer: I am not a veterinarian. I do not take responsibility for any issues that may result from any of the information in this guide. This is provided as information only, is not meant to be exhaustive, and is intended largely to provide resources and to help ensure you ask your veterinary team the right questions.

When appropriate I have cited sources where specific information was quoted or summarized, and I would recommend those sources be sought out to further increase the reader's knowledge. It is worth noting that I am located in the United States. I have provided reference material from other countries as well, however, surgery, medication, supplement, and equipment options may vary by country.

If you would like to see something added or edited in this document, please feel free to contact me at ammfoto@mac.com. The latest version can be found in the Canine Elbow Dysplasia section of my website at www.allyssamader.com.

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1. Introduction

Elbow dysplasia simply means abnormal growth or development of the elbow joint. It is primarily thought to be genetic, controlled by multiple genes that have not yet been identified.^{1,2,3,4} Elbow dysplasia may be suspected if your dog shows persistent lameness in one or both front legs. Often, lameness may be subtle and come and go for months or even years. Puppies as young as five months can begin to show signs of elbow dysplasia, and very often it is diagnosed during adolescence.⁵

There are three main types of elbow dysplasia: 1) fragmented coronoid process (FCP), 2) osteochondritis dissecans (OCD), and 3) ununited anconeal process (UAP).^{6,7} FCP the most common of these types, though some dogs are impacted by multiple types. UAP is more common in German Shepherds and Bernese Mountain Dogs.⁸ Another less common type of dysplasia, called incomplete ossification of the humeral condyle (IOHC), is primarily found in spaniels.⁹

In the most common type of elbow dysplasia, FCP, the elbow joint forms in such a way that the bones within the elbow joint are in conflict with each other.¹⁰ This incongruity may result in too much pressure or load on certain structures within the joint, and that pressure may cause the bone to begin to crack or break off into the elbow joint. These bone fragments may

¹ Orthopedic Foundation for Animals. (n.d.). Elbow Dysplasia. Retrieved from <https://www.ofa.org/diseases/elbow-dysplasia>

² American College of Veterinary Surgeons. (n.d.). Canine Elbow Dysplasia. Retrieved from <https://www.acvs.org/small-animal/canine-elbow-dysplasia>

³ Fitzpatrick Referrals. (n.d.). What is canine elbow dysplasia? Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

⁴ Schulz, K., Beale, B., Holsworth, I., Hudson, S., Hulse, D. (with Davidson, A.). (2006). *The Pet Lover's Guide To Canine Arthritis & Joint Problems*. St. Louis, MO: Elsevier Inc.

⁵ American College of Veterinary Surgeons. (n.d.). Canine Elbow Dysplasia. Retrieved from <https://www.acvs.org/small-animal/canine-elbow-dysplasia>

⁶ American College of Veterinary Surgeons. (n.d.). Canine Elbow Dysplasia. Retrieved from <https://www.acvs.org/small-animal/canine-elbow-dysplasia>

⁷ Schulz, K., Beale, B., Holsworth, I., Hudson, S., Hulse, D. (2006). *The Pet Lover's Guide To Canine Arthritis & Joint Problems*. St. Louis, MO: Elsevier Inc.

⁸ Fitzpatrick Referrals. (n.d.). Elbow Ununited Anconeal Process (UAP). Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/ununited-anconeal-process-uap/>

⁹ Willows Veterinary Centre & Referral Service. (n.d.). Incomplete ossification of the humeral condyle (IOHC). Retrieved from <https://www.willows.uk.net/specialist-services/pet-health-information/orthopaedics/humeral-condylar-fissures>

¹⁰ Schulz, K., Beale, B., Holsworth, I., Hudson, S., Hulse, D. (2006). *The Pet Lover's Guide To Canine Arthritis & Joint Problems*. St. Louis, MO: Elsevier Inc.

then move around within the elbow joint causing damage to the cartilage. Incongruity in the elbow joint may be temporary during a certain stage of growth, or permanent after the dog is done growing. If the joint incongruity is temporary, removing the bone fragments may resolve the dog's lameness and he or she may not require further treatment. However, if the joint incongruity is permanent and no surgical correction is made to resolve it, the structures will remain in conflict with each other, causing continual stress on the joint, leading to progressive joint deterioration.¹¹

It is important to note that elbow dysplasia can range from mild to severe, however, all dogs with elbow dysplasia will go on to develop some degree of osteoarthritis in the joint.¹² Osteoarthritis, otherwise known as arthritis or degenerative joint disease, is a painful condition all on its own. Dog's with elbow dysplasia have abnormal joint anatomy which causes damage to the structures with the joint. This causes inflammation and further joint deterioration that eventually results in progressive osteoarthritic changes.¹³

While discussing treatment options with your veterinary team, keep in mind that surgical treatments carry risks and recovery from surgery can be time intensive and challenging for both dogs and caretakers. Having a thorough understanding of any recommended surgical procedures, as well as realistic expectations for what surgical intervention can achieve, will help ensure you are making informed choices.

¹¹ Fitzpatrick Referrals. (n.d.). What is canine elbow dysplasia? Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

¹² Fitzpatrick Referrals. (n.d.). What is canine elbow dysplasia? Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

¹³ American College of Veterinary Surgeons. (n.d.). Canine Elbow Dysplasia. Retrieved from <https://www.acvs.org/small-animal/canine-elbow-dysplasia>

2. Diagnostics

2.1 Clinical examination

Usually, diagnostics for elbow dysplasia begin with a clinical examination by your regular veterinarian. Your vet will likely check your dog's range of motion and look for any pain while bending and extending the elbow and other joints in the forelimb. They may also want to observe your dog walk and trot to watch for lameness. After this exam, they may suggest X-rays to screen for a number of possible causes of forelimb lameness.

2.2 X-ray

The first imaging tool used to screen for elbow dysplasia is usually X-ray. It is a relatively easy, affordable, and accessible test for most veterinarians and owners to complete. Unfortunately, especially in young dogs, changes to the elbow joint may be subtle and hard to see on X-ray.¹⁴ A negative X-ray will often result in owners being sent home with anti-inflammatory medication and instructions to rest the dog for a few weeks to see if the lameness resolves.

2.3 CT Scan

When lameness does not resolve, owners will often be referred to a veterinary orthopedic specialist who may suggest a CT scan. These scans are a highly sensitive imaging tool for diagnosing elbow dysplasia, as well as determining the severity of the issues within the joint.¹⁵ CT scans require sedation, are relatively expensive, and are usually only available at specialty clinics.

2.4 Arthroscopy

Arthroscopy allows surgeons to evaluate the interior of the elbow joint up close. While arthroscopy can be used as a diagnostic tool, it is usually only performed when a problem is suspected that can be corrected using arthroscopic techniques.

My experience: The cost of the higher-level imaging is worth it to make sure you have all the information available when determining treatment options. Taking a wait-and-see approach can result in delays that cause additional, and possibly irreversible, cartilage and/or bone damage.

¹⁴ Fitzpatrick Referrals. (n.d.). Radiography. Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

¹⁵ Fitzpatrick Referrals. (n.d.). Computed tomography (CT). Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

3. Surgical options

Current surgical options for elbow dysplasia are well explained on the Fitzpatrick Referrals website at <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>. I would highly recommend reading through this page and looking at the graphics carefully. I have attempted to summarize and simplify their explanations of surgical options below. In cases of UAP and IOHC, screws are often used to reattach the loose bone (UAP) or close the fissure (IOHC).^{16,17} Those procedures may be done alone or in combination with one of the following surgical options.

3.1 Arthroscopy

During elbow arthroscopy, a small incision is made in the joint and a camera is inserted. This allows the surgeon to see exactly what pathologies exist within the joint. Some repairs and procedures can be done via arthroscopy, including bone fragment removal, microfracture, and subtotal coronoid ostectomy. Arthroscopy can be, and often is, performed along with other surgical procedures.

3.2 Subtotal coronoid ostectomy (SCO)

Often, due to incongruity within the joint, dogs with elbow dysplasia will have fractures of the coronoid process of the ulna. This structure will often continue to fracture resulting in bone fragments within the joint if left in place. As a result, many surgeons opt to remove the majority of the coronoid process, a procedure called subtotal coronoid ostectomy¹⁸ or subtotal coronoidectomy. This can be done via arthroscopy or traditional open surgical techniques depending on the surgeon's preference.

3.3 Proximal ulnar osteotomy (PUO)

Sometimes, elbow dysplasia is caused by joint incongruity that can be improved by performing a proximal ulnar osteotomy (PUO). In this procedure, a 'dynamic oblique' cut is made to the ulna below the elbow joint. This allows the ulna to move and heal in a way that hopefully improves joint congruity, relieves pain, and attempts to limit future arthritis.¹⁹

¹⁶ Fitzpatrick Referrals. (n.d.). Elbow Ununited Anconeal Process (UAP). Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/ununited-anconeal-process-uap/>

¹⁷ Willows Veterinary Centre & Referral Service. (n.d.). Humeral Condylar Fissures. Retrieved from <https://www.willows.uk.net/specialist-services/pet-health-information/orthopaedics/humeral-condylar-fissures>

¹⁸ Fitzpatrick Referrals. (n.d.). Subtotal coronoid ostectomy (SCO). Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

¹⁹ Fitzpatrick Referrals. (n.d.). Proximal ulnar osteotomy (PUO). Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

3.4 Proximal abducting ulnar (PAUL) osteotomy

The proximal abducting ulnar osteotomy (PAUL) surgery aims to unload the medial compartment of the elbow, and thereby reduce pain and improve function. This procedure utilizes a specialized plate to secure an ulnar osteotomy while the bone heals into a new position.^{20,21}

3.5 Biceps ulnar release (BURP)

Biceps ulnar release (BURP) may be performed in cases where there is radio-ulnar conflict resulting in part from excessive force by one of the branches of the biceps tendon that attaches on the coronoid process itself. Biceps ulnar release helps to neutralize this force.²²

3.6 Sliding humeral osteotomy (SHO)

In dogs with advanced osteoarthritis resulting from elbow dysplasia, advanced medial compartment disease often exists. In these cases, a load altering procedure called a sliding humeral osteotomy (SHO) may relieve pressure on the diseased portion of the joint and shift it to the healthier outer portion of the joint. During this procedure, the humerus is cut and fixed into a new position using a special plate and screws.²³

3.7 Canine unicompartmental elbow (CUE)

The canine unicompartmental elbow surgery utilizes an implant to resurface the diseased portion of the medial compartment in order to alleviate the pain of bone on bone grinding.²⁴

3.8 Total elbow replacement (TER)

Currently, total elbow replacement (TER) surgery is considered a salvage surgery when other treatments have failed. In this surgery, the entire elbow joint surface is replaced with an elbow prosthesis.^{25,26}

²⁰ Fitzpatrick Referrals. (n.d.). Proximal abducting ulnar (PAUL) osteotomy. Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

²¹ Kyon Veterinary Surgical Products. (n.d.). Proximal Abducting Ulnar Osteotomy. <https://www.kyon.ch/current-products/proximal-abducting-ulnar-osteotomy-paul>

²² Fitzpatrick Referrals. (n.d.). Biceps ulnar release (BURP). Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

²³ Fitzpatrick Referrals. (n.d.). Sliding humeral osteotomy (SHO). Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

²⁴ Anthrex Vet Systems. (2017). Canine Unicompartmental Elbow (CUE) Client Information. Retrieved from <https://www.arthrexvetsystems.com/small-animal/canine-unicompartmental-elbow-cue>

²⁵ Fitzpatrick Referrals. (n.d.). Total elbow replacement. Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

²⁶ BioMedtrix. (n.d.). Total elbow replacement. Retrieved from <https://biomedtrix.com/total-elbow-replacement/>

My experience: It is incredibly disappointing to realize after the fact that a different surgical treatment may have been more effective in treating your dog's condition. Sometimes, additional surgery can be done to correct the underlying issue (such as surgeries to improve joint congruity or shift the load off of the diseased portion of the elbow), however, as a dog ages, the damage within the joint may become so severe there are no additional surgical options available. Therefore, it is worth taking the time to understand exactly what is going on with your dog's elbows, what all of the surgical options are, and pursuing multiple qualified opinions before deciding on a treatment plan.

4. Prior to surgery, recovery, and management of post-surgical patients

*** Prior to scheduling any surgery, I would highly recommend getting
at least one second opinion. ***

4.1 Prior to surgery

While discussing surgical options for your dog, here are a few questions to consider asking your dog's surgeon(s):

1. Why have you recommended this particular surgery? (Alternatively, why specifically are you recommending no surgical intervention?)
2. How many of these procedures have you performed and how often do you perform them?
3. At what age is this surgery most frequently performed?
4. What aspects of my dog's elbow dysplasia do you expect this procedure to resolve?
5. What would you expect this dog's elbows/mobility to look like in one/five/ten years with this surgery? What about without this surgery?
6. In my dog's case, what is the underlying issue causing elbow dysplasia (ie., temporary or permanent joint incongruity/abnormality such as ulnar notch incongruity, comparatively short radius, UAP, etc.)?
7. Are there other surgical procedures available for this type of elbow dysplasia that you do not perform?
8. Would you recommend harvesting stem cells during the surgery for future therapeutic use? (See section 5.1.1 for more information on stem cell harvesting and therapy.)

4.2 What to expect before/during/and after surgery

If possible, in advance of the surgery, I would recommend discussing with the surgeon and their staff exactly what their surgical protocol is, as well as what restrictions will be in place after surgery. For nearly all elbow procedures, activity will need to be limited for a period of time once surgery is complete. How long, and exactly what restrictions will depend upon the surgery performed and the surgeon's preferences. Learning about these restrictions prior to the procedure will help you plan and prepare which can be very helpful. Here are a few recommended questions to ask the veterinary team when discussing surgery:

1. Will I need to give my dog any medication prior to surgery?
2. Are there any medications and/or supplements I need to stop prior to surgery, and if so, how far in advance?
3. When will I need to drop my dog off for surgery?

4. Will my dog need to stay overnight after the surgery? And if so, will someone be at the hospital monitoring my dog at night?
5. Will you or a member of your staff call me after the surgery is complete? Will you go over how the surgery went, what was found, what procedures were done?
6. What medications should I expect my dog to be on after surgery?
7. Will a sedative be prescribed for the recovery period? If so, which one(s)?
8. What are the post-surgical follow up appointments I should plan for and how long will they take?
9. What is the best way to reach you/get advice if I have issues/questions after surgery?
10. Will my dog need bandage/splint changes after surgery?
11. Will I need to provide any wound care immediately after surgery?
12. What activities **won't** my dog be allowed to do in the first few days/weeks after surgery?
13. What activities **will** my dog be allowed to do in the first few days/weeks after surgery?
14. Would you recommend I have any special equipment on hand? (ie. ice packs, heat packs, wrapping material, splint, Assisi Loop, harness, crates/gates, ramps, etc.)
15. Do you recommend I work with a veterinary rehabilitation specialist during my dog's recovery? If so, when will my dog be allowed to start rehab? Do you have a rehab specialist you recommend? Will there be any restrictions on the physical therapy activities/timing?
16. Will my dog be allowed to get on and off furniture/sleep in bed with me?
17. Will my dog be able to get in and out of the car, and what is the best way to manage them in the car after surgery?
18. When will my dog be allowed unlimited leash walks?
19. When will my dog be allowed off-leash time?
20. When will my dog be allowed to play with other dogs?
21. What type of exercise do/don't you recommend for my dog long-term?
22. How should I handle a sudden increase in pain/lameness (a flare) during or after the surgical recovery?

4.3 Recommended equipment and supplies

Prior to surgery I would recommend purchasing, unwrapping, setting up, and being familiar with the following items:

1. Multiple exercise pens (to use as indoor fencing): These are useful for limiting your dog's movement, keeping him or her off of furniture, closing off slippery areas, stairs, etc. It is helpful to set these up at least a few days prior to surgery so your dog is familiar with them. Pens are available in both plastic and metal, and in a variety of heights. Prior to surgery, you will want to have an idea of what height and type your dog will respect. These can also be helpful for use outdoors to create areas for your dog to sniff and potty while keeping him or her from running around. Personally, I like plastic exercise pens such as these for indoors https://www.chewy.com/iris-8-panels-exercise-plastic-pen/dp/133342?gclid=EAlaIQobChMI0ob3oJna3wIVjsBkCh1dqwXkEAAYAiAAEglyOPD_BwE and metal exercise pens like these for outdoors <https://www.chewy.com/petmate-8-panel-wire-exercise-pen/dp/111775>.
2. A crate that is large enough to comfortably contain your dog, even if he or she is wearing a cone. Make sure your dog is happy to hang out in the crate (this usually requires training), and assuming he or she does not shred bedding, lay down several layers of soft washable bedding/towels ahead of the surgery.
3. A low-to-the-ground memory foam or egg crate foam dog bed. Some dogs may enjoy bolsters around the edges, but having a large low flat opening is helpful for dogs who are having a hard time lifting front and/or back legs. I like to provide both a flat bed like this one (<https://www.orvis.com/p/memory-foam-platform-dog-bed/2z75>) and a bolstered bed like this one (<https://www.llbean.com/llb/shop/66314?page=therapeutic-dog-couch&bc=31-134-507408&feat=507408-GN3&csp=f>). For a list of dog beds recommended by others who have dogs with elbow dysplasia see Appendix B.
4. Long sleeve T-shirts or surgical sleeves/suits to protect bandages and/or incisions. Try a few sizes prior to surgery to see how your dog tolerates them, and if you think you will want to use them, have 2-5 shirts/sleeves on hand for after surgery. These can be an excellent alternative to cones for some dogs. Even dogs who still require cones in order to leave incisions or bandages alone may benefit from a shirt or surgical sleeve to protect delicate post-surgical incisions or shaved skin.
5. A cone/cone alternative. Most vets will provide you with a standard plastic cone for preventing access to bandages or incisions. Alternatives include an inflatable donut, or a soft fabric cone. The type of product depends on the dog and how determined he or she is to get to the incisions/bandages. Whatever you plan to use, introduce it to your dog ahead of time, and have him or her practice wearing it, so it is not such a shock after surgery.
6. Non-slip carpet runners/area rugs/mats for any slippery flooring. Hardware stores often carry runners that can be cut by the linear foot to fit your home. Yoga mats can also be purchased in bulk rolls and cut to size.

7. A comfortable harness with a handle to help your dog during the initial recovery from surgery. Ask your vet if they will send your dog home with such a harness, or if they recommend a certain brand. If your vet has no preference, the Ruff Wear Webmaster Harness™ is a great harness with a handle to help your dog get up, to steady them, and to help with stairs, etc. (<https://ruffwear.com/products/web-master-harness>). Introduce your dog to the harness ahead of time, and have them practice wearing it. Some dogs are very opposed to wearing harnesses, so practicing ahead of time can be very helpful.
8. Lots of interactive toys and games, chews, and new toys. Some good options are Kongs, Toppls, puzzle toys like those made by Nina Ottosson, scatter mats, and hide-a-squirrel stuffed toys. Always supervise dogs with toys and chews!

4.4 Recovery and management

During the first few days after surgery, your dog may need quite a bit of assistance to get around. It can be helpful to keep him or her in a harness with a handle so that you can provide support as they walk. Be aware that harnesses may rub and irritate incisions or other contact points, so be watchful if they are being used for extended periods of time. Rough areas can be covered with sheepskin or moleskin to prevent abrasions.

Depending on the dog, you may also need to attach a leash to slow movement and prevent jumping. Having large pens set up in your main living areas can be very helpful for restricting your dog's movement, while allowing you to sit nearby to keep them company. Depending on your surgeon's preference, your dog may need to be walked outside on a leash for potty breaks for a few days or several weeks. Follow your surgeon's instructions on activity restriction, and be particularly careful about preventing running, slipping, and jumping. Utilize sedatives as necessary and as prescribed by your veterinarian. If you were not provided any sedatives and are having issues, get in contact with the surgeon's office and explain the situation and ask for help.

If you need to leave your dog home alone, he or she will likely need to be crated, placed in a pen, or locked in a small room to prevent running or jumping. Keep in mind that this type of confinement should be trained ahead of time so that your dog is not overly stressed by the confinement after surgery.

My experience: Surgeon's and their veterinary staff are busy and often do not adequately prepare owners for what will be needed after a dog's orthopedic surgery. It is challenging to deal with a dog immediately after orthopedic surgery, and not having the right supplies or a proper set up at home can make things more stressful than necessary, and potentially cause your dog to injure themselves. Take the time to figure out what the surgeon's requirements will be, what will be needed from you to accommodate that, and what special issues your particular dog may have during their recovery. For example: Do they normally run everywhere and leap constantly, which may necessitate the use of sedatives? Are they terrified of the vet and required to go back for weekly bandage changes? Are they used to sleeping on furniture with you making settling down elsewhere/away from you impossible? Are they afraid of crates and will need to be crated for a month? Etc.

5. Medical treatments

There are many medical treatments that can be helpful in the treatment of elbow dysplasia either in addition to, or instead of, surgical intervention.²⁷

5.1 Intra-articular injections

Intra-articular injections are injections made directly into a joint space. These injections are done by a veterinarian, with the dog placed under sedation for safety and accuracy. There are several types of injections available for this type of therapy.²⁸

5.1.1 Stem cells

Either during surgery, or with a local anesthetic, adipose fat can be collected from the dog for harvesting stem cells. In the United States, a company called VetStem (<http://www.vet-stem.com>) offers a service that processes, isolates, and concentrates mesenchymal stem cells from this tissue, along with many other regenerative cells. These cells can then be injected back into the dog's elbow joints and can potentially provide an anti-inflammatory effect, decreased pain, and possible healing of damaged tissues. Because these are the dog's own cells, this procedure is relatively low risk, though sedation may be required. For a fee, VetStem can bank therapeutic doses of your dog's cells for future use.²⁹

5.1.2 Platelet rich plasma (PRP)

During platelet rich plasma (PRP) therapy, a small amount of blood is taken from the dog and then spun down to separate the platelets from the other components of the blood. The concentrated platelets are then injected back into the dog's joint to help promote healing and reduce inflammation.^{30,31,32}

5.1.3 Hyaluronic acid (HA)

Hyaluronic acid (HA) can be injected directly into the dog's elbow joints, either alone, or in addition to stem cells or platelet rich plasma. HA is similar to a substance that is naturally

²⁷ Brajkovich, J., Terpstra, C. (2019, August 27). Applying nonsurgical treatment options in management of osteoarthritis. Veterinary Practice News. Retrieved from <https://www.veterinarypracticenews.com/osteoarthritis-september-2019/>

²⁸ Canine Arthritis Resources and Education. (n.d.). How can joint injections help my dog's arthritis? Retrieved from <https://caninearthritis.org/article/how-can-joint-injections-help-my-dogs-arthritis/>

²⁹ VetStem Biopharma. (n.d.). FAQ's. Retrieved from <https://vetstem.com/faqs.php>

³⁰ The Sams Clinic. (n.d.). Platelet Rich Plasma. Retrieved from <http://www.thesamsclinic.com/pain-management-1/>

³¹ Nall, R. (2017, November 21). What you need to know about PRP. Medical News Today. Retrieved from <https://www.medicalnewstoday.com/articles/320107.php>

³² Brajkovich, J., Terpstra, C. (2019, August 27). Applying nonsurgical treatment options in management of osteoarthritis. Veterinary Practice News. Retrieved from

occurring in the joints, and acts like a lubricant or shock absorber.³³ Experimental studies of HA injected directly into dogs' joints have shown decreased pain, as well as improved joint health.^{34,35}

5.1.4 Synovetin OA®

Synovetin OA® is a novel radio-isotope which can be injected into the elbow joints to help reduce the symptoms of chronic pain from osteoarthritis in dog's elbows.³⁶ More information can be found at <https://www.synovetin.com>.

5.1.5 Arthramid® Vet

Arthramid® Vet is a hydrogel product approved for intra-articular injection in horses which some veterinarians are using off label for dogs with elbow dysplasia.³⁷

5.1.6 Steroid injections

Steroid (a.k.a. cortisone) injections are a common procedure in human orthopedics and sports medicine.³⁸ Just as in human medicine, steroids can be injected into the dog's joints in an attempt to calm inflammation and relieve pain. However, it is important to understand that steroid injections do nothing to help heal damaged joint tissues, and in fact can have a negative effect on the joints and the dog's overall health in the long-term.³⁹

³³ Mayo Clinic. (n.d.). Hyaluronic Acid (Injection Route). Retrieved from <https://www.mayoclinic.org/drugs-supplements/hyaluronic-acid-injection-route/description/drg-20074557>

³⁴ Canapp, S. Jr. (2010, September 1). Surgery STAT: Intra-articular therapies for the elbow in dogs, Three options for optimal care and comfort. DVM360 MAGAZINE. Retrieved from <https://www.dvm360.com/view/surgery-stat-intra-articular-therapies-elbow-dogs>

³⁵ Brajkovich, J., Terpstra, C. (2019, August 27). Applying nonsurgical treatment options in management of osteoarthritis. Veterinary Practice News. Retrieved from <https://www.veterinarypracticenews.com/osteoarthritis-september-2019/>

³⁶ Synovetin OA®. (n.d.) Retrieved from <https://www.synovetin.com>

³⁷ Arthramid® Vet. (n.d.) Retrieved from <https://arthramid.com/products/arthramid-vet/>

³⁸ Cluett, J. (2018, December 19). Using Cortisone Shots for Inflammation Learn about the benefits, side effects, and more. Very Well Health. Retrieved from <https://www.verywellhealth.com/cortisone-shot-side-effects-2549714>

³⁹ Wag! (n.d.). Can Dogs Get Cortisone Shots for Arthritis? Retrieved from <https://wagwalking.com/wellness/can-dogs-get-cortisone-shots-for-arthritis>

5.2 Extracorporeal shockwave therapy (ESWT)

During extracorporeal shockwave therapy (ESWT), or shockwave therapy, sound energy is used to promote healing. When used on injured tissues or arthritic joints, the treatment may improve healing, reduce pain, and improve function. This treatment can be uncomfortable, so some patients may need sedation.^{40,41,42}

5.3 Physical rehabilitation

Maintaining your dog's physical condition throughout his or her life is one of the most important things you can do for overall health, and especially for the dog's elbows. This includes keeping him or her at an optimal weight, muscles strong, and range of motion as normal as possible. One of the best ways to do this is to work with someone who specializes in canine physical rehabilitation.^{43,44} These are usually either veterinarians or human physical therapists who have completed specialized training in physical rehabilitation, and they are often assisted by veterinary technicians who have completed extra training in rehabilitation. You can find certified rehabilitation therapists around the world by going to http://www.caninerehabinstitute.com/Find_A_Therapist.html.

A rehabilitation program will likely involve multiple stages, various types of exercises, and different modalities as he or she recovers from surgery or progresses through a therapy program.⁴⁵ In the beginning, you will likely be given passive range of motion (ROM) exercises, which will require you to move your dog's forelegs in specific ways to help stretch the joint and improve mobility. You may also be given very basic balancing exercises for your dog, which will help him or her regain proper proprioception and gain strength. Eventually, your dog will likely need to strengthen his or her muscles and begin conditioning work. When and how these exercises are done depends on your veterinarian's preference and the availability of facilities nearby. For those who have access to full rehab facilities, underwater treadmills or pools can be great options for increasing strength, mobility, and conditioning. For those without access to that type of facility, specific exercises can often be tailored to the

⁴⁰ Fitzpatrick Referrals. (n.d.). Extracorporeal Shockwave Therapy (ESWT). Retrieved from <https://www.fitzpatrickreferrals.co.uk/services/rehabilitation/physiotherapy/>

⁴¹ The Sams Clinic. (n.d.). Shockwave Therapy. Retrieved from <http://www.thesamsclinic.com/pain-management-1/>

⁴² Brajkovich, J., Terpstra, C. (2019, August 27). Applying nonsurgical treatment options in management of osteoarthritis. *Veterinary Practice News*. Retrieved from <https://www.veterinarypracticenews.com/osteoarthritis-september-2019/>

⁴³ Schulz, K., Beale, B., Holsworth, I., Hudson, S., Hulse, D. (2006). *The Pet Lover's Guide To Canine Arthritis & Joint Problems*. St. Louis, MO: Elsevier Inc.

⁴⁴ Brajkovich, J., Terpstra, C. (2019, August 27). Applying nonsurgical treatment options in management of osteoarthritis. *Veterinary Practice News*. Retrieved from <https://www.veterinarypracticenews.com/osteoarthritis-september-2019/>

⁴⁵ Canapp, S., Acciani, D., Hulse, D., Schulz, K., Canapp, D. (2009). Rehabilitation Therapy for Elbow Disorders in Dogs. *Veterinary Surgery*. 38:301-307, 2009. Retrieved from <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1532-950X.2008.00496.x>

environment around you under the instruction of a rehabilitation specialist. There are even online canine conditioning classes available, such as those available through the Fenzi Dog Sports Academy <https://www.fenzidogsportsacademy.com/index.php/courses/fun-and-fitness>.

In addition to stretching, strengthening, and conditioning, there are a variety of modalities that are often utilized by canine rehabilitation specialists, including cold laser, transcutaneous electrical nerve stimulation (TENS), ultrasound, acupuncture, shockwave therapy, pulsed electromagnetic field (PEMF) therapy such as an Assisi Loop or Assisi Loop Lounge <https://assisianimalhealth.com>, ice and heat.

5.4 Holistic veterinary options

Holistic veterinary medicine considers and evaluates the entire patient, not just the particular disease(s) he or she is suffering. With a condition that is chronic and progressive, like elbow dysplasia, this can be particularly useful. In the United States, you can utilize the American Holistic Veterinary Medical Association (AHVMA) website to find a member veterinarian: <https://www.ahvma.org>. Some common treatments utilized by holistic veterinarians are outlined here, however this is not an exhaustive list.

5.4.1 Acupuncture

Acupuncture for animals is often provided by holistic veterinarians, pain management specialists, and physical rehabilitation specialists. According to the Mayo Clinic, "Traditional Chinese medicine explains acupuncture as a technique for balancing the flow of energy or life force – known as chi or qi (chee) – believed to flow through pathways (meridians) in your body. By inserting needles into specific points along these meridians, acupuncture practitioners believe that your energy flow will re-balance. In contrast, many Western practitioners view the acupuncture points as places to stimulate nerves, muscles and connective tissue. Some believe that this stimulation boosts your body's natural painkillers."⁴⁶

Regardless of the mechanism of action, research in humans indicates that acupuncture provides therapeutic benefit for osteoarthritis.⁴⁷ Acupuncture can be delivered in a variety of ways, including traditional fine needles left in place for several minutes, acupressure (pressure only is applied to acupuncture points), aquapuncture (a liquid injected into acupuncture points), electroacupuncture (needles are attached to a device that generates electric pulses), and gold wire/bead acupuncture (where gold wire/beads are implanted under the skin into acupuncture points to provide continuous stimulation). The type of acupuncture chosen will depend on your veterinarian's preference and your dog's condition.

⁴⁶ Mayo Clinic. (n.d.). Acupuncture. Retrieved from <https://www.mayoclinic.org/tests-procedures/acupuncture/about/pac-20392763>

⁴⁷ Selfe, T., Taylor, A. (2008). Acupuncture and Osteoarthritis of the Knee, A Review of Randomized, Controlled Trials. *Fam Community Health*. 2008 Jul-Sep; 31(3): 247-254. doi: 10.1097/01.FCH.0000324482.78577.0f

Many dogs tolerate acupuncture well, although it is a good idea to provide an activity such as a chew or a Kong when attempting acupuncture with young exuberant dogs.

5.4.2 Herbal therapy

Herbal therapy is often used by holistic veterinarians as a complement to acupuncture, however it can be used alone in dogs who do not tolerate acupuncture. Herbal therapy dates back thousands of years across multiple cultures. A holistic veterinarian may treat your dog with Western herbs, Ayurvedic herbs from India, traditional Chinese herbs, Native American herbs, etc.

5.4.3 Chiropractic therapy

Animal chiropractic is a medical therapy that is used to maintain the health and normal functioning of the nervous and musculoskeletal systems. In general, chiropractic treatments or adjustments correct subluxations.⁴⁸ The American Veterinary Chiropractic Association website maintains a list of certified animal chiropractic doctors in the United States and some other countries at <http://animalchiropractic.org>.

5.4.4 Diet

Because elbow dysplasia causes chronic inflammation of the elbow joint, it can be helpful to work with a holistic veterinarian or veterinary nutritionist to find a diet that will help reduce overall inflammation in your dog's body. There is no "one size fits all" when it comes to diet, and finding a diet that works well for you and your dog may take some experimentation.

⁴⁸ Integrative Veterinary Center. (n.d.). Animal Chiropractic. Retrieved from <http://integrativeveterinarycenter.com/general-services/#Animal-Chiropractic>

6. Medications

This is not intended to be a comprehensive list of medications, but rather a brief description of common medications prescribed for post-surgical patients, dogs with occasional lameness, and dogs living with significant chronic pain due to elbow dysplasia and resulting osteoarthritis.⁴⁹ Often multiple drugs will be needed in combination as part of a multi-modal pain management regimen.⁵⁰

6.1 Nonsteroidal anti-inflammatory drugs (NSAIDs)

Nonsteroidal anti-inflammatory drugs (NSAIDs) are a commonly prescribed type of pain medication for humans and dogs. They help to relieve pain and reduce inflammation, and can be very effective for surgical, occasional, and chronic pain situations. Both short- and long-term use carry risks, including gastrointestinal upset and liver and kidney damage. Commonly prescribed NSAIDs for dogs are: carprofen (Novox or Rimadyl), deracoxib (Deramaxx), firocoxib (Previcox), meloxicam (Metacam), and Galliprant.⁵¹ If your dog ends up requiring long-term use of a NSAID, he or she should have regular blood work to monitor kidney and liver function.

6.2 Opioids

There are many opioids used within veterinary hospitals to control pain; however, the most common opioid prescribed for home use in dogs is tramadol. The effectiveness of tramadol in controlling pain in dogs is controversial; however, it is still widely used for post-surgical pain, and sometimes for mild sedation. It may also be prescribed in combination with other pain medications when it is thought to provide additional pain relief as part of a multi-modal pain relief plan.⁵²

For particularly painful surgeries (and in some cases of chronic pain), dogs may be sent home wearing a Fentanyl patch. Fentanyl is a powerful opioid, which is absorbed well through transdermal application. If your dog is wearing a Fentanyl patch, be careful not to touch it

⁴⁹ Puotinen, C.J. (Updated 2019, January 10). Prescription Drugs for Dogs' Arthritis Pain. Whole Dog Journal. April 2017 Issue. Retrieved from https://www.whole-dog-journal.com/issues/20_4/features/Drugs-for-Arthritis-Pain_21627-1.html

⁵⁰ Canine Arthritis Management. (2021, February 7). CAM Conversation WITH Dr Karen Perry ABOUT NSAIDs and Multimodal Analgesia in the Medical Management of Osteoarthritis. Retrieved from <https://caninearthritis.co.uk/cam-conversation-with-dr-karen-perry-about-nsaids-and-multimodal-analgesia-in-the-medical-management-of-osteoarthritis/>

⁵¹ Flowers, A. (Reviewed 2018, January 21). WebMD. Pain Medications for Dogs. Retrieved from <https://pets.webmd.com/dogs/guide/dog-pain-medications#1>

⁵² McKenzie, B. (2018, June 26). Is tramadol an effective analgesic for dogs and cats? Veterinary Practice News. Retrieved from <https://www.veterinarypracticenews.com/is-tramadol-an-effective-analgesic-for-dogs-and-cats/>

with bare hands, be cautious that children do not come in contact with it, and ensure that it is not eaten by the dog wearing it, or by any other pets.⁵³

6.3 Gabapentin

Originally developed as a human seizure medication, Gabapentin has also been found to be effective for some types of nerve and bone pain. It is often prescribed for surgical patients, or as part of a multi-modal pain management plan. There are relatively few side effects in dogs and there is a wide margin of safety in dosing.^{54,55}

6.4 Amantadine

Amantadine is a human medication with multiple uses. When used for pain management, Amantadine can reverse or prevent the over-amplification of signals by the nervous system, called central sensitization. Central sensitization is a major component in the development of chronic and neuropathic pain.⁵⁶

6.5 Sedatives

In order to keep your dog quiet and calm after surgery, you may need to use sedatives. There are many sedatives available, but one that has been shown to be particularly effective for canine patients during recovery of orthopedic injuries/surgeries is Trazodone.⁵⁷ Actually a human antidepressant medication, Trazodone can be used in the treatment of behavioral issues in dogs, and is often prescribed to pre-medicate dogs that suffer from anxiety during veterinary visits.⁵⁸

⁵³ Zeltzman, P. (Revised 2015, February). Pain Patches, What are they and when are they used? Bark The Dog Culture Magazine. Issue 58: Feb/Mar 2010. Retrieved from <https://thebark.com/content/pain-patches>

⁵⁴ Vogelsang, J. (n.d.). Gabapentin for Dogs: What You Need to Know. PetMD. Retrieved from <https://www.petmd.com/dog/care/gabapentin-dogs-what-you-need-know>

⁵⁵ Grubb, T. (n.d.). Gabapentin and Amantadine for Chronic Pain: Is Your Dose Right? Today's Veterinary Practice. Retrieved from <https://todaysveterinarypractice.com/gabapentin-and-amantadine-for-chronic-pain/>

⁵⁶ Grubb, T. (n.d.). Gabapentin and Amantadine for Chronic Pain: Is Your Dose Right? Today's Veterinary Practice. Retrieved from <https://todaysveterinarypractice.com/gabapentin-and-amantadine-for-chronic-pain/>

⁵⁷ Gruen, M., Roe, S., Griffith, E., Hamilton, A., Sherman, B. (2014, August 1). The Use of Trazodone to Facilitate Post-Surgical Confinement in Dogs. Journal of the American Veterinary Medical Association. 245(3): 296-301. <https://doi.org/10.2460/javma.245.3.296>

⁵⁸ Primovic, D. (2018, March 16). Trazodone (Oleptro®, Desyrel®) for Dogs and Cats. PetPlace. Retrieved from <https://www.petplace.com/article/drug-library/drug-library/library/trazodone-oleptro-desyrel-for-dogs-and-cats/>

6.6 Chondroprotective Injections

There are a few medications that can be injected subcutaneously or intramuscularly on a regular basis either by your veterinarian, or possibly at home if permitted by your vet. Each of these medications is thought to help improve joint health in a variety of ways. They are: Adequan (polysulfated glycosaminoglycan), Cartrophen Vet (sodium pentosan polysulfate), and the horse product LEGEND® (hyaluronate sodium).

6.7 Monoclonal antibodies

Monoclonal antibody treatment is new and not yet widely available. One injectable medication, Librela® (bedinvetmab) has been approved in the UK and Europe.⁵⁹ More information on the science behind this treatment can be found online at the following website: <https://www.zoetisus.com/oa-pain/first-time-resolution.aspx/#>

6.8 Steroids

Oral steroids can be used to treat osteoarthritis. They are strong anti-inflammatory drugs, and can provide quick and effective pain relief. However, they have significant side-effects, can be damaging if used long-term, and can interact negatively with other medications. For these reasons, they are not often prescribed for arthritic pain, but may be used as a last resort.⁶⁰

My experience: A multi-modal pain management approach seems to be the most helpful for treating pain related to elbow dysplasia. Do not be afraid to push your veterinary team for more pain control options if your dog is not comfortable.

⁵⁹ BioSpace. (2020, November 12). Zoetis Receives European Commission Marketing Authorization for Librela® (bedinvetmab). Retrieved from <https://www.biospace.com/article/releases/zoetis-receives-european-commission-marketing-authorization-for-librela-bedinvetmab-/>.

⁶⁰ Puotinen, CJ. (Updated 2019, January 10). Prescription Drugs for Dogs' Arthritis Pain. Whole Dog Journal. April 2017 Issue. Retrieved from https://www.whole-dog-journal.com/issues/20_4/features/Drugs-for-Arthritis-Pain_21627-1.html

7. Nutraceuticals

The term nutraceutical is defined as “a foodstuff (such as a fortified food or dietary supplement) that provides health benefits in addition to its basic nutritional value”.⁶¹ Their use in dogs is quite common, however, their efficacy is often unproven. The following list highlights those nutraceuticals that I know are commonly used in dogs, and that I have found to have some research indicating their usefulness in treating osteoarthritis in either humans and/or dogs. It is helpful to understand what each of these nutraceutical are thought to do, and also what research there is to support their use. Nutraceutical are a whole industry onto themselves, and companies often make lofty claims about why their product is superior to all others on the market. I would highly recommend that you talk to your orthopedic surgeon/ physical rehabilitation specialist/holistic vet about what supplements they recommend and why.

7.1 Omega-3 fatty acids

Omega-3 fatty acids, specifically EPA and DHA, are thought to be one of the more effective ways to help improve joint health and alleviate the symptoms of osteoarthritis. One of the easiest way to provide Omega-3 fatty acids is via fish oil. However, research in dogs indicates that fairly high quantities of Omega-3s are needed to reach a therapeutic level.⁶² In order to provide this, make sure the fish oil supplement you are giving has a high density of Omega-3s. There is a huge variety of fish oil products for humans and dogs on the market, and many of them would require a large amount be given in order to reach the optimal amount of Omega-3s per day.⁶³ You can reference the chart at <http://csu-cvmb.colostate.edu/vth/small-animal/sports-medicine-rehabilitation/Pages/fish-oil-dosing-chart.aspx> to see how many milligrams of Omega-3s your dog needs per day.⁶⁴ An easy way to calculate an approximate dose is to use the following formula: 55 times your dog’s weight in pounds given in milligrams of Omega-3 per day. For example, if your dog weighs 60 pounds, you will want to give your dog 3,300 milligrams of Omega-3s per day (55 times 60 = 3,300). Avoid fish oil with Omega-6 and-9, as they are thought not to be therapeutic for dogs, and may actually cause inflammation.⁶⁵ If you need to increase the amount of Omega-3s your

⁶¹ Merriam-Webster. (n.d.). Nutraceutical. Retrieved from <https://www.merriam-webster.com/dictionary/nutraceutical>

⁶² Canine Arthritis Resources and Education. (n.d.) How much Omega 3 fatty acids should I give my dog? Retrieved from <https://caninearthritis.org/article/how-much-omega-3-fatty-acids-should-i-give-my-dog/>

⁶³ Bauer, J. (2011, December 1). Therapeutic use of fish oils in companion animals. Journal of the American Veterinary Medical Association. Vol. 239, No. 11, Pages 1441-1451. <https://doi.org/10.2460/javma.239.11.1441>

⁶⁴ Colorado State University, Veterinary Teaching Hospital. (n.d.). Sports Medicine and Rehabilitation. Fish oil dosing chart. Retrieved from <http://csu-cvmb.colostate.edu/vth/small-animal/sports-medicine-rehabilitation/Pages/fish-oil-dosing-chart.aspx>

⁶⁵ Loeff M, et al. (2018, August 3). Fatty acids and osteoarthritis: different types, different effects. Joint Bone Spine. <https://doi.org/10.1016/j.jbspin.2018.07.005>

dog is getting, go slow to prevent digestive upset. Consult with your veterinarian if your dog has a history of pancreatitis.

7.2 Glucosamine, chondroitin, MSM, etc.

There are a variety of supplements available that are thought to help improve joint health and mobility.⁶⁶ The main ones are glucosamine HCl, chondroitin sulfate, hyaluronic acid (HA), methylsulfonylmethane (MSM), New Zealand green-lipped mussel (*Perna canaliculus*) and cetyl myristoleate (Cytel M®). It is not uncommon to find joint supplements that contain all of these ingredients plus others in one tablet or chew, as they are thought to work synergistically to improve joint health. The following brands have research indicating beneficial effects: Cosequin®, Dasuquin® and Glycoflex III®.⁶⁷

7.3 CBD oil

Cannabidiol (CBD) oil is extracted from the flowers and buds of marijuana or hemp plants. If extracted from the hemp plant, CBD oil will not contain significant amounts of tetrahydrocannabinol (THC). THC is what causes the intoxication normally associated with marijuana. If extracted from the marijuana plant, CBD oil may contain varying amounts of THC. Dogs are very sensitive to THC, so the use of marijuana-based CBD oil in dogs should be done cautiously, and ideally under the direction of an experienced medical professional. Unfortunately, due to legality restrictions, veterinarians in the United States are not allowed to prescribe or discuss the use of marijuana-based CBD oil in dogs. However, it is still something worth discussing with a vet if you can, and if you decide to place your dog on any type of CBD oil, you should disclose that to any treating veterinarians.

There are many claims regarding the possible benefits of cannabidiol; however, there have been very few studies proving efficacy.⁶⁸ It is widely advertised as being beneficial to alleviate pain due to inflammation and osteoarthritis, which may exist in cases of elbow dysplasia. One company, ElleVet (<https://www.ellevetsciences.com>), partnered with Cornell University to do a small study which supported their products effectiveness in providing pain relief.^{69,70}

⁶⁶ Schargen, K. (2013, July 12). Nutraceuticals for animal arthritis. Animal Wellness. Retrieved from <https://animalwellnessmagazine.com/nutraceuticals-arthritis/>

⁶⁷ Colorado State University, Veterinary Teaching Hospital. (n.d.). Sports Medicine and Rehabilitation. Glucosamine/Chondroitin Sulfate containing agents. Retrieved from <http://csu-cvms.colostate.edu/vth/small-animal/sports-medicine-rehabilitation/Pages/arthritis-management-and-prevention.aspx>

⁶⁸ Thompson, D. (2018, May 7). CBD Oil: All the Rage, But Is It Safe & Effective? HealthDay News. WebMD. Retrieved from <https://www.webmd.com/pain-management/news/20180507/cbd-oil-all-the-rage-but-is-it-safe-effective#1>

⁶⁹ Gamble, L., Boesch, J., Frye, C., Schwark, W., Mann, S., Wolfe, L., Brown, H., Berthelsen, E., Wakshlag, J. (2018, July 23). Pharmacokinetics, Safety, and Clinical Efficacy of Cannabidiol Treatment in Osteoarthritic Dogs. Frontiers in Animal Science. Retrieved from <https://doi.org/10.3389/fvets.2018.00165>

⁷⁰ ElleVet. (n.d.). News. Cornell University Study Says Hemp Oil Works For Dogs. Retrieved from <https://www.ellevetsciences.com/news/cornell-university-study-says-hemp-oil-works-for-dogs-in-pain/>

Due to lack of regulation, there is a lot of variability in product quality, quantity of CBD, and recommended dosage. If you want try giving a CBD product to your dog, try to compare apples to apples by looking at the number of milligrams of CBD advertised in a given product, and evaluating any claims of purity (e.g., Where are the plants grown? Are they organic?, etc.). There are many companies making and selling CBD oil specifically for dogs, and the majority of it is derived from hemp. These products should not have any psychoactive properties. Three well-respected companies selling CBD products specifically for dogs in the United States are PetReleaf (<https://petreleaf.com>), Charlotte's Web (<https://www.cwhemp.com/all-charlottes-web-cannabinoid-hemp-cbd-supplements>), and ElleVet (<https://www.ellevetsciences.com>).

7.4 Turmeric

Turmeric has been widely lauded as having pain relief, anti-inflammatory, and antioxidant properties, and has been used for thousands of years in India for a huge variety of ailments. Studies have found it to be helpful for pain relief from osteoarthritis in humans, and other uses are being heavily researched by Western medicine.⁷¹ It may be worth doing a trial of turmeric to see if it provides pain relief for your dog, as it is relatively cheap and easily accessible. However, be aware that it can cause gastrointestinal upset and may act as a blood thinner.⁷² The easiest way to give turmeric is to buy it in capsule form, however, you will want to research the appropriate dose for your dog's weight. As with all supplements, be sure to inform any treating veterinarians that your dog is taking turmeric.

My experience: Do as much research as you can about the purity of the products you are buying. Going with a few high quality products may be better than trying to give your dog everything on the market. Rotating, combining, and experimenting with nutraceuticals can be very helpful. However, make sure your dog is getting enough Omega-3 fatty acids on a daily basis. This may be one of the most important things we can do to help our dog's joint health.

⁷¹ Ware, M. (2018, May 24). Everything you need to know about turmeric. Medical News Today. Retrieved from <https://www.medicalnewstoday.com/articles/306981.php>

⁷² Scott, D. (n.d.). The Top 5 Health Benefits Of Turmeric For Dogs. Dogs Naturally Magazine. Retrieved from <https://www.dogsnaturallymagazine.com/turmeric-dogs/>

8. Living with elbow dysplasia

8.1 What to expect

Living with a dog who has elbow dysplasia can be difficult at times. While many dogs with elbow dysplasia live fairly normal active lives, they may have painful periods even as young dogs, and they may progress into chronic pain as they age. Regardless of whether surgery is performed, dogs with elbow dysplasia will invariably develop some degree of osteoarthritis with age.⁷³ It is the progression and symptoms of osteoarthritis that can become challenging to manage over a dog's lifetime. Supportive care may need to be adjusted periodically to ensure a dog with elbow dysplasia remains as functional and comfortable as possible. He or she may require different exercise regimens, supplements, pain medications, medical treatments, and even different veterinarians or possibly additional surgery over the course of their lifetime.

8.2 Osteoarthritis

Osteoarthritis, otherwise known as arthritis or degenerative joint disease, is a painful condition that can affect the joints of both animals and people.⁷⁴ Dogs with elbow dysplasia have abnormal joint anatomy which causes damage to the joint structures. This causes inflammation and further joint deterioration that eventually results in progressive arthritic changes.⁷⁵

It is helpful to understand that osteoarthritis itself is a painful and progressive disease that causes several changes to the joint. These changes are well described by Schulz et al. (2006 p.6):

- *Wearing down and cracking of cartilage*
- *Thickening and stiffening of the joint capsule (fibrosis)*
- *Hardening and grinding down of the bone beneath the cartilage (sclerosis and eburnation)*
- *New bone growth around the joint (osteophytosis)*
- *Thinning of the joint fluid*⁷⁶

There are several things that can be done to try to slow the progression of arthritic changes even in dogs with abnormal joint anatomy. Many of the suggestions in this guide are aimed at optimizing joint health, including medical treatments, physical rehabilitation, nutraceuticals, and home modifications. These options and more can be further explored online on the

⁷³ Fitzpatrick Referrals. (n.d.). What is canine elbow dysplasia? Retrieved from <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>

⁷⁴ Canine Arthritis Management. What is Arthritis? Retrieved from <https://caninearthritis.co.uk/what-is-arthritis>

⁷⁵ American College of Veterinary Surgeons. (n.d.). Canine Elbow Dysplasia. Retrieved from <https://www.acvs.org/small-animal/canine-elbow-dysplasia>

⁷⁶ Schulz, K., Beale, B., Holsworth, I., Hudson, S., Hulse, D. (2006). *The Pet Lover's Guide To Canine Arthritis & Joint Problems*. St. Louis, MO: Elsevier Inc.

Colorado State University, Veterinary Teaching Hospital, Orthopedic Medicine and Mobility website at <http://csu-cvmb.colostate.edu/vth/small-animal/sports-medicine-rehabilitation/Pages/arthritis-management-and-prevention.aspx>, the Canine Arthritis Management website at <https://caninearthritis.co.uk>, the Canine Arthritis Resources and Education (CARE) website at <https://caninearthritis.org>, and in *The Pet Lover's Guide To Canine Arthritis & Joint Problems* by Schulz et al. (2006).

There is not always a direct correlation between the severity of degenerative change that can be seen within the joint and the dog's level of function and comfort. In addition, dogs vary significantly in their pain tolerance and stoicism. For this reason, I would suggest that as your dog ages, you work closely with a veterinary physical rehabilitation professional, have periodic evaluations with a veterinary orthopedist, and if possible include a pain management specialist and a holistic veterinarian in your dog's care team.

8.3 Pain Management

Pain management can become a huge issue in dogs with elbow dysplasia. They may go through periods when they are very lame or even completely unable to walk. It can be incredibly helpful to work regularly with a veterinary professional who specializes in pain management. These doctors are well versed in the most up-to-date pain management options and will often know how to combine multiple drugs and therapies in order to maximize benefits while minimizing side effects. They may also have other non-pharmaceutical options for helping to control and minimize your dog's pain. Two resources for finding such specialists around the world are the American College of Veterinary Anesthesia and Analgesia (ACVAA), <http://www.acvaa.org>, and the International Veterinary Academy of Pain Management (IVAPM), <https://ivapm.org>.

Signs of pain to be aware of in dogs are as follows: decreased social interaction, aggressive behavior, changes in eating, drinking, and sleeping habits, being more vocal (whimpering, howling, growling), excessive grooming or self-mutilation (chewing), heavy panting or altered breathing, mobility issues, signs of agitation, changes in body and posture, anxious expression, submissive behavior, refusal to move, and guarding behavior.^{77,78}

In addition, I have observed the following signs of pain and discomfort specific to elbow dysplasia: standing regularly with one forefoot placed farther forward than the other, regularly turning one forefoot out to the side when standing, altered gate (such as swinging one or both forelegs out to the side and around when moving, attempting to keep them from bending at the elbow), and resistance to having front paws lifted.

⁷⁷ International Veterinary Academy of Pain Management. (n.d.). Common signs of pain in dogs and cats. Retrieved from <https://ivapm.org/common-signs-pain-dogs-cats/>

⁷⁸ Playforth, L. (2018, September 19). 9 warning signs that could mean your dog is in pain. Vets Now Blog. Retrieved from <https://www.vets-now.com/2017/06/10-signs-dog-pain/>

8.4 Flares

Most dogs with elbow dysplasia will occasionally have times when they seem more painful for a period of time. Sometimes these happen for an obvious reason (unusual activity, like a run on the beach or in the snow/ice), and sometimes they happen for no reason that we are able to determine. These flares can range from mild to severe. A mild flare might include symptoms such as stiffness when first getting up from rest, or a head bob when walking. A severe flare may cause a dog to be completely unable to bear weight. Flares can be distressing for both the dog and the owner, and knowing they are going to happen, and how to handle them ahead of time can be very helpful.

Prior to having an issue (at the earliest convenient opportunity), it may be helpful to go through the following questions with your vet team:

1. What pain control medication(s) would you recommend in the event of a flare? What dose and how many times per day? (**I would recommend keeping a current supply of the prescribed medication(s) at all times, and it should stay with the dog during travel or boarding**).
2. For how long should my dog be given the medication(s)? (For example, a few days or a few weeks?)
3. What physical activity do you recommend during a flare? (For example, is crate rest necessary, or are leash walks okay?)
4. How long should physical activity be limited? (For example, a few days or a few weeks?)
5. Is there anything else you would recommend during a flare? (For example, ice, heat, massage, Assisi Loop, etc.)
6. At what point do you recommend the dog be seen by a veterinarian if they have a flare? (For example, if they are unable to bear weight? If they aren't responding to pain medication? If the flare hasn't resolved in a few days/weeks?)

Flares by their very nature should resolve within a relatively short period of time (a few days to a few weeks). If you are not seeing signs that your dog is responding to rest, or the pain medications prescribed to them are not helping, then it is likely time to have a veterinarian do an examination. If the wait for your veterinary orthopedist is long (as they often are), it is a good idea to start with your general veterinarian. General veterinarians can do an examination and determine if the elbow is actually the issue, or if the dog has injured something else. The general veterinarian can also help with pain control until the veterinary orthopedist can see the dog.

8.5 The home environment

Dogs with elbow dysplasia may benefit from some simple changes to the home environment to reduce the toll on their elbows.

The following is a list of items that may be helpful for a dog living with elbow dysplasia. If possible, try to introduce equipment to your dog before they need it. For example, ramps can be very scary for dogs, especially if their mobility is already compromised.

1. Non-slip carpet runners and area rugs for any bare floors. Providing good traction is very helpful as even small slips can cause injuries and flares.
2. Non-slip booties or toe grips. You may need to experiment to figure out which style is helpful for your dog. (Personally, I love Grippers™ Non Slip Dog Socks <https://dogquality.com/products/grippers>.)
3. Ramps/stairs for getting into/out of the car and onto/off of furniture and beds.
4. Harnesses to help support the front end, such as the Ruff Wear Webmaster Harness™ (<https://ruffwear.com/products/web-master-harness>). Some dogs will eventually also need help with their rear end, in which case the Help 'Em Up™ Dog Harness is a great option (<https://helpemup.com>).
5. A low-to-the-ground memory foam or egg crate foam dog bed. Some dogs may enjoy bolsters around the edges, but having a large low flat opening is helpful for dogs who are having a hard time lifting front and/or back legs. I like to provide both a flat bed like this one (<https://www.orvis.com/p/memory-foam-platform-dog-bed/2z75>) and a bolstered bed like this one (<https://www.llbean.com/llb/shop/66314?page=therapeutic-dog-couch&bc=31-134-507408&feat=507408-GN3&csp=f>). For a list of dog beds recommended by others who have dogs with elbow dysplasia see Appendix B.

8.6 Exercise

It is important for dogs with elbow dysplasia and resulting osteoarthritis to continue to exercise.⁷⁹ The benefits of exercise in humans with arthritis are well documented.⁸⁰ You should consult with your orthopedic vet and/or physical rehabilitation specialist on the type and quantity of exercise that is best for your dog throughout his or her life.⁸¹ In general, walking and swimming are good exercise options, whereas jumping, forced running (e.g.

⁷⁹ Colorado State University. Veterinary Teaching Hospital. Orthopedic Medicine and Mobility. Arthritis Management and Prevention. Osteoarthritis. (n.d.). Exercise Modification/ Physical Rehabilitation. Retrieved from <http://csu-cvmb.colostate.edu/vth/small-animal/sports-medicine-rehabilitation/Pages/arthritis-management-and-prevention.aspx>

⁸⁰ Mayo Clinic. (2018, December 19). Exercise helps ease arthritis pain and stiffness. Retrieved from <https://www.mayoclinic.org/diseases-conditions/arthritis/in-depth/arthritis/art-20047971>

⁸¹ Brajkovich, J., Terpstra, C. (2019, August 27). Applying nonsurgical treatment options in management of osteoarthritis. Veterinary Practice News. Retrieved from <https://www.veterinarypracticenews.com/osteoarthritis-september-2019/>

running next to a bike or jogging with a person or on a treadmill), and retrieving with hard stops and turns, should be avoided.

As your dog's osteoarthritis progresses, you may find it hard to motivate him or her to exercise, or even go for a walk. However, it is important to keep dogs moving, so work to find motivators that inspire him or her. Some dogs like walking in new places, with other dogs, or walking with or meeting new people. If your dog likes water, swimming can be a wonderful way for dogs with even severe osteoarthritis to get some much needed exercise.

8.7 The aging dog

As your dog ages, you may need to make even more changes to your home environment to make things easier for him or her. Older dogs may have trouble getting around on slippery surfaces or getting up from lying down. He or she may have trouble navigating stairs, getting into/out of the car, getting onto furniture, or even getting into a dog bed. It may be hard to motivate them to go for even short walks. Take time to do special things with them, for example outings where not much walking is required, like visiting a coffee shop or restaurant with an outdoor patio.

My experience: Caring for a dog with elbow dysplasia is both deeply rewarding and very hard. Watching them take joy in the simple pleasures of life is incredibly inspiring, but watching them struggle to stand up or walk can be heartbreaking. Do all you can to keep them comfortable and moving, and don't be afraid to lean on your veterinary team when you need help. Try to be flexible and open to new ideas, medications, treatments, etc., as you navigate this disease with your dog.

9. Conclusion

It is my hope that this document provides some help to dog owners facing the unfortunate diagnosis of elbow dysplasia in their dogs. Luckily, most people do not end up with multiple dogs with elbow dysplasia, however, that also means having to learn about the disease as you go. It is hard to be in a situation in which you don't know what questions to ask, what to do, or how to prepare. You don't know what you don't know, and so I think many people, myself included, find themselves looking back and wishing they had known more so they could have made different choices or asked different questions.

If you would like to see something added or edited in this document, please feel free to contact me at ammfoto@mac.com. The latest version can be found in the Canine Elbow Dysplasia section of my website at www.allysamader.com. If you find that any of the website links that I provide in this document are no longer active, please let me know so that I can provide updated links.



Olly and me in 2018

Appendix A. Suggested reading

- *The Pet Lover's Guide To Canine Arthritis & Joint Problems* by Schulz et al. (2006)
- Fitzpatrick Referrals webpage located at <https://www.fitzpatrickreferrals.co.uk/orthopaedic/canine-elbow-dysplasia/>
- Orthopedic Foundation for Animals webpage located at <https://www.ofa.org/diseases/elbow-dysplasia>
- American College of Veterinary Surgeons webpage located at <https://www.acvs.org/small-animal/canine-elbow-dysplasia>
- Canine Arthritis Management webpage located at <https://caninearthritis.co.uk>
- Canine Arthritis Resources and Education (CARE) webpage located at <https://caninearthritis.org>

Appendix B - Dog bed recommendations

- LaiFug Orthopedic Memory Foam: <https://amzn.to/3uuwpSQ>
- Bully Bed: <https://bullybeds.com/>
- K9 Ballistics Orthopedic crate pad: <https://bit.ly/3bvZkNG>
- Crib mattress: <https://amzn.to/3ssTe7o>
- Sealy gel foam dog bed: <https://amzn.to/3pLRuVe>
- Sealy dog beds: https://sealydogbeds.com/?product_cat=all-beds
- Big Barker beds: <https://bigbarker.com/collections/orthopedic-dog-beds>
- Orthopedic bed from Costco: <https://bit.ly/37Mjimb>
- Orvis dog beds: <https://www.orvis.com/memory-foam-dog-beds>
- LL Bean orthopedic egg crate foam bed: <https://bit.ly/2P4j2bD>
- LL Bean Therapeutic Dog Couch: <https://bit.ly/3bylWxa>
- Barkbox dog bed: <https://amzn.to/3spHtyN>
- 4"+ memory foam: <https://amzn.to/2ZMVIqr>
- Bedsure Orthopedic Dog Sofa Beds w/Memory Foam: <https://amzn.to/3bw3F3q>
- Paws.com dog beds - website under construction
- Petfusion dog beds: <https://pet-fusion.com/collections/pet-beds>
- Dogbed4less Premium memory foam dog bed: <https://www.dogbed4less.com/collections/pet-bed-category>
- Big Dog Bed Company: <http://www.bigdogbeds.com/>
- Casper: <https://casper.com/dog-beds/>
- Knufflewiff beds: <https://www.knuffelwuff.co.uk/Orthopaedic>
- Ivy and Duke Luxury Beds: <https://ivyandduke.co.uk/shop/>
- Hygienic bed from Zooplus: <https://bit.ly/3dGPmvt>
- The Dogs Bed: <https://amzn.to/2MkP5Dc>
- Underdog Pet Products: <https://underdogpetproducts.com/orthopedic-pet-beds/>