



## **The artificial elbow for dogs**

**A treatment option for advanced elbow dysplasia  
and end-stage osteoarthritis**

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## The sore elbow

If your dog suffers from pain in the elbow joint, this is often due to osteoarthritis. Osteoarthritis is the body's reaction to increased wear and tear. In about 90% of cases, osteoarthritis is the result of a congenital malformation (dysplasia). Fast-growing and large breeds are particularly frequently affected. This can impair their quality of life even at a young age. However, injuries such as fractures of the joint, constant overloading and other degenerative changes can also lead to osteoarthritis and pain in the elbow.

Signs of pain include reluctance to move, restlessness, stiffness, lameness and reluctance to perform everyday activities. Affected animals usually adopt a visibly relieving posture. Their weight is shifted to the inside of the joint, which leads to increased stress and thus to increased abrasion of the cartilage between the upper arm and forearm joint surfaces. This is often the case on both sides, i.e. the dog does not just limp on one leg. The cartilage is gradually completely worn away by the wear and tear, so that bone rubs against bone.

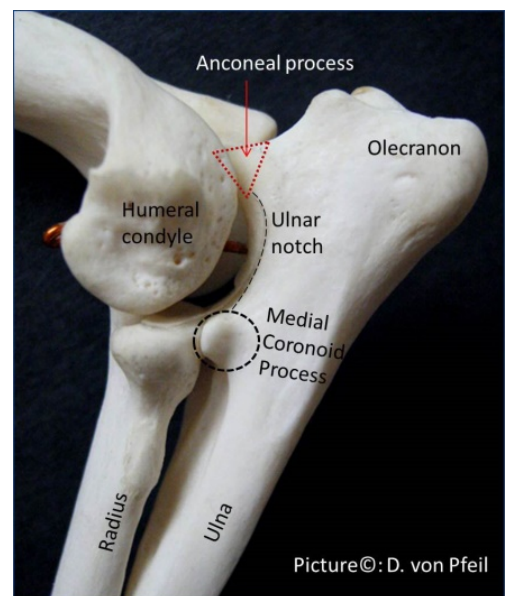
During movement, the bone surfaces that now lie on top of each other rub against each other, causing further pain, inflammation and irregular bone formation around the joint. The result is osteoarthritis of the joint. Unfortunately, osteoarthritis cannot be cured. In the case of very advanced osteoarthritis, it may therefore be advisable to consider an elbow endoprosthesis, i.e. an artificial elbow.

In the following, we present a new treatment option and explain its advantages and disadvantages.

## What does the anatomy of the elbow look like?

The elbow joint in dogs is a complex joint consisting of three main bones: the humerus (upper arm bone), ulna (ulna) and radius (radius). These bones are connected by ligaments and muscles and enable a variety of movements, including flexion and extension of the elbow and pronation and supination (rotation) of the paw. They provide the desired mobility on the one hand, but also the necessary stability on the other.

All three bones must grow and develop correctly and at the same pace so that they fit together perfectly at the elbow joint. This is the only way to create a healthy joint that moves smoothly and allows the animal to walk without pain. If this is not the case and the anatomy is incorrectly formed, this is referred to as elbow dysplasia (ED).



## What is dysplasia of the elbow (ED) and how does osteoarthritis develop?

Elbow dysplasia (ED) is an umbrella term describing a number of orthopaedic deformities/disorders of the elbow. It is one of the most common causes of lameness and pain in the forelimbs, especially in larger breeds. ED is congenital and occurs in young dogs, usually between 4 and 10 months of age. The symptoms usually get worse over time.

Elbow dysplasia includes the following disorders:

- **Fragmented medial coronoid process (FPC):**  
This is a condition in which part of the ulna, known as the coronoid process, breaks or fragments. This fracture can lead to pain, joint inflammation and restricted movement.
- **Osteochondrosis dissecans (OCD):**  
OCD is a disease in which cartilage or bone fragments form in the joint. These fragments can cause pain and impair normal joint movement.
- **Incomplete ossification of the radial head (IORD):**  
This is a condition in which the radial head, a bone in the elbow, does not mature or form properly. This can lead to pain and restricted movement.
- **Non-ossified anconeus process:**  
In this case, the upper part of the ulna does not grow together with the body of the ulna, which leads to irritation of the joint and pain.
- **Medial compartment syndrome:**  
This disease affects the inside of the elbow joint and is usually associated with complete loss of cartilage.

All these problems lead to pain and inflammation in the elbow joint area and ultimately to osteoarthritis, which, as in humans, is very painful.

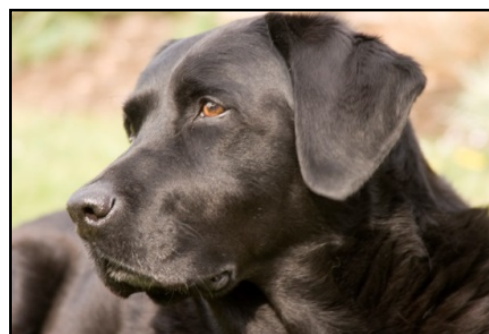
## What is the cause of ED and which breeds are affected?

The cause of ED is usually due to genetic defects, which is why certain dog breeds are affected much more frequently. Affected dogs and those whose ancestors already had ED should not be used for breeding.

In contrast to a genetic predisposition, a traumatic fracture of the medial coronoid process can occur in older dogs, especially in very athletic, active dogs (agility, flyball, etc.). Compared to ED, the prognosis for this so-called "jump-down syndrome" is much better.

The following dog breeds are particularly frequently affected:

- Labrador Retriever
- Bernese Mountain Dog
- German Shepherd Dog
- Golden Retriever
- Newfoundland
- Rottweiler
- Saint Bernard
- Bassett



### How can I tell if my dog has ED or osteoarthritis of the elbow joint?

Lameness that worsens with activity is the most common clinical sign of ED and osteoarthritis. If the problem is bilateral, the lameness sometimes appears to switch from one side to the other. The degree of lameness can vary from mild to severe. Often the elbows appear to be turned outwards and there may be swelling over the elbow joints. The dogs can only bend their elbows to a limited extent and often swing the leg outwards in an arc when walking.

### How is an ED or osteoarthritis diagnosed?

Examination of the elbow can reveal pain, thickening and swelling as well as restricted movement.

In addition to a thorough clinical examination, x-rays of the elbow should be taken. In most cases, a computer tomography (CT) scan or arthroscopy (joint endoscopy) is also recommended and performed.



### How is osteoarthritis or ED treated?

The treatment of osteoarthritis or ED in dogs depends on various factors, including the severity of the condition, the type of ED and the individual needs of the dog. Treatment can range from conservative measures to surgical interventions. Conservative measures are always the first step!

Some common treatment options are listed below:

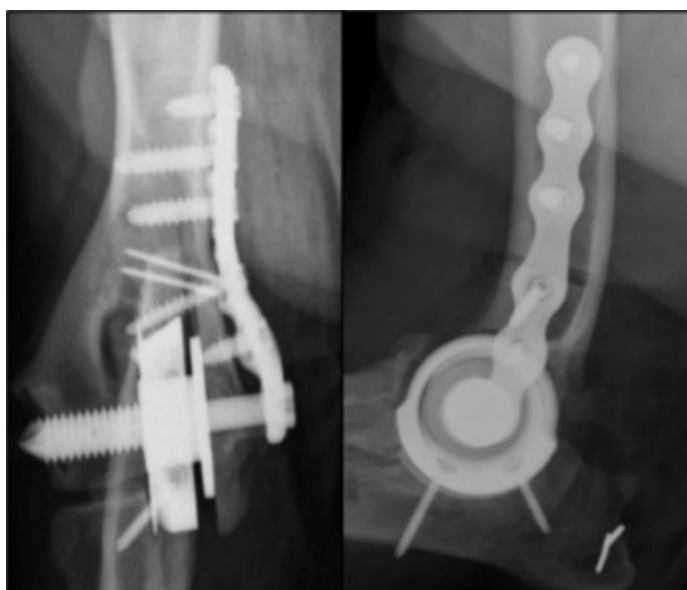
- a. Weight management: Excess weight puts strain on the joints. The dog carries 60% of its body weight on the forelimbs. Weight control helps to reduce stress on the elbow joint and improve symptoms. It has been shown that 6 - 10% weight reduction can greatly improve lameness.
- b. Physiotherapy: Physiotherapy can help to improve the mobility of the joint, strengthen the muscles and relieve pain. It can include various exercises, massages and passive movement therapies.
- c. Acupuncture, laser, ultrasound: these options are always worth a try, but success cannot be guaranteed.
- d. Feed supplements: The administration of e.g. glucosamine and chondroitins can help to support joint health. Omega-3 fatty acids from marine sources (fish oil) are the feed supplement that has shown the best results in numerous studies. The dosage is far higher than for humans.
- e. Drug therapy: Non-steroidal anti-inflammatory drugs (NSAIDs) can be prescribed to reduce pain and inflammation in the elbow joint. Injections that block the receptors of the nerves within the joint and thus relieve the pain can also be helpful.
- f. Joint injections: PRP (platelet-rich plasma), HA (hyaluronic acid) and corticosteroids can be used successfully in many cases.
- g. Arthroscopy: In some cases, an arthroscopy can be performed to examine the elbow joint. Small bones or cartilage fragments can be removed. In addition, the extent of the cartilage damage is determined and whether there are step formations between the ulna and radius that may not have been clearly diagnosed on X-ray or CT. If necessary, this can then be corrected.
- h. Corrective surgical measures: The aim here is to change the load and thus relieve the overstressed parts of the joint. These include PAUL (Proximal Abducting Ulnar Osteotomy) or SHO (Sliding Humeral Osteotomy), in which the ulna (ulna) or the humerus (humerus) is cut and re-fixed at a different angle, depending on the surgical technique. Unfortunately, there is no solid scientific data to support these methods.
- i. Replacement of parts of the articular cartilage: In the so-called "CUE" (Canine Unicompartimental Elbow), a small part of the diseased cartilage is replaced by a small metal part in the humerus and a plastic part in the ulna. This is intended to take over the load during movement. As only approx. 20% of the cartilage-free joint surface is supplied with an implant, the implants also rub directly on the bone during flexion and extension. In addition, the results of published studies should be treated with caution, as they were supported by the implant manufacturer and there are direct links to the developer of the implant.
- j. Elbow joint replacement: If the osteoarthritis is very advanced, the only remedy is an artificial joint, which replaces a larger area of the affected, cartilaginous joint. However, it has proven very difficult to completely replace the elbow joint for anatomical reasons. A complete endoprosthesis is technically very difficult and the various models used to date, such as the "Iowa Elbow" or "TATE", have not shown convincing results and in some cases have resulted in severe complications. In contrast, the partial prosthesis, the so called total medial elbow replacement, based on the results of scientifically correct studies carried out since 2008, shows promising results.

## When is a joint replacement an option?

An elbow joint prosthesis is usually only considered when conservative treatment options (see above) are not sufficient and the dog continues to have significant pain and restricted movement. Here are some situations in which joint replacement might be considered:

- **Advanced osteoarthritis:**  
This is usually associated with considerable pain and functional limitations, which can no longer be remedied with conservative treatment measures.
- **Young dogs with severe ED:**  
It may also be advisable to consider joint replacement in young dogs with severe ED. The idea is to prevent long-term damage to the remaining parts of the joint that are not replaced by the partial prosthesis.
- **Quality of life:**  
The decision to have an elbow joint prosthesis also depends on the dog's quality of life. If the dog is in considerable pain and the osteoarthritis or ED severely impairs its enjoyment of life and mobility, a joint replacement may be considered.

## What's new in elbow arthroplasty: The partial prosthesis

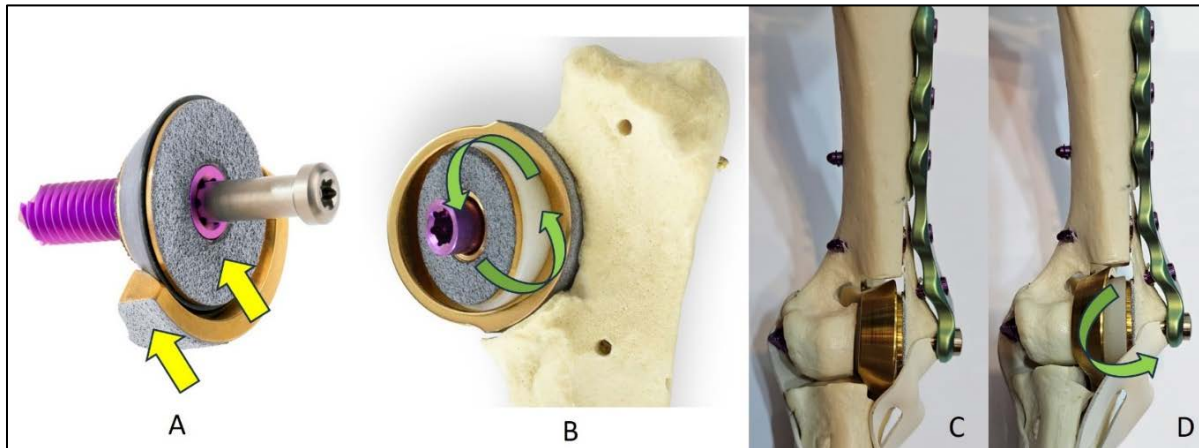


In suitable cases, the "Total Medial Elbow Replacement (TME)" can be helpful. This system of an artificial partial joint replaces only the inner part of the elbow joint, where the worst cartilage abrasions typically occur.

This implant has been carefully developed and used in affected dogs in the USA since 2008. As the long-term results were good, the TME has now also been used in other selected clinics since 2023. Only a handful of orthopaedic surgeons who have successfully distinguished themselves through many years of experience are approved for

this by the TME manufacturer "Movora". Thanks to Dr. Dirsko von Pfeil, Bessy's Small Animal Clinic is among this very limited selection worldwide.

Not only does Bessy's Small Animal Clinic have the only surgeon in Switzerland authorized to implant the TME, Dr. Dirsko von Pfeil, but is also collaborating on a study to gather further clinical information that will help other patients and surgeons in the future to make the best decision in the treatment of end-stage ED. There is no financial conflict of interest in this collaboration. Bessy's Small Animal Clinic has decided to offer this option because this method currently offers the best prognosis for dogs with severe elbow osteoarthritis.



To fit the prosthesis, a piece of the joint bone must first be removed. This is reinserted at the end of the operation and secured with a special bone plate (C, D, green bone plate). The implant itself fuses with the surrounding bone (A; yellow arrows show the fusion zones). Compared to other systems, the design of this artificial joint allows better freedom of movement (B, D, green arrows) and therefore almost normal joint movement. The results so far are very promising.

### How can my dog get a TME?

Only patients who have the problems described above and are at least the size of a Labrador can be considered as potential surgical candidates. Various diagnostic measures are required prior to surgery. These include X-ray, blood count, possibly also treadmill analysis, computer tomography, arthroscopy and joint puncture. They are carried out beforehand under separate anesthesia and are important for surgical planning.

The owners of patients being considered for this operation must confirm their consent in writing using special forms:

- to the operation
- for intensive cooperation and communication (study)
- to return to the clinic at certain times (2 weeks, 8 weeks, 6 months, 12 months)
- Acceptance of possible complications

If you are interested in registering your dog for this operation, it is best to make an appointment directly with Dr. Dirscho von Pfeil at Bessy's Kleintierklinik, where everything can be discussed and planned in detail.



## What is the prognosis?

The results so far are very promising. However, not enough cases have been operated on worldwide at the moment to guarantee an excellent prognosis for all dogs. Our aim is to give the dogs pain-free movement in everyday life. In addition, every operation is associated with possible complications, which are discussed in detail beforehand. Based on the many years of development of the implant and our current state of knowledge, we can nevertheless assume that TME is a very good option for alleviating the pain of arthritic elbows in affected dogs and restoring a good quality of life.

## Summary

Even if ED is diagnosed and treated early, the long-term prognosis must be made with caution. There are many treatment options to help the patient, at least temporarily. Of course, it is also important that other problems that could lead to lameness are ruled out in advance. Numerous techniques are described for treating dogs with end-stage elbow disease. What they all have in common is that the pathologically altered joint is not cured. There is no one-size-fits-all approach to successfully treating each individual patient with severe osteoarthritis and ED and therefore the prognosis for return to fully normal function is very guarded.

The TME (elbow prosthesis) offers a new, promising treatment option, which we are able to offer exclusively at Bessy's Small Animal Clinic thanks to Dr. Dirsko von Pfeil.

## Contact and further information

If you would like to see the advantages of an elbow prosthesis for yourself or if you have any questions about the procedure for your dog, please send us an e-mail or give us a call.

E-mail: [orthopaedie@bessys.ch](mailto:orthopaedie@bessys.ch)

Phone reception Bessy's Small Animal Clinic: [+41 44 871 60 60](tel:+41448716060)

Phone Orthopaedics (personal assistant to Dr. von Pfeil): [+41 44 577 45 38](tel:+41445774538)

## Dr. med. vet. Dirsko von Pfeil

Bessy's Small Animal Clinic

Specialist for Surgery, Orthopaedics, Sports Medicine

Chief Physician of Orthopaedics & Senior Physician of Sports Medicine



### Curriculum Vita

Since 2023	Bessy's Small Animal Clinic: Chief Orthopaedic Surgeon, Senior Veterinarian, Sports medicine
2018	Founder of Small Animal Surgery Locum, PLLC
2009-2019	Associate Professor of Small Animal Orthopedics: Michigan State University
2008-2022	Senior Veterinarian at major American surgical referral hospitals in Alaska, Virginia, Washington DC, Omaha. Focus: Orthopaedics and sports medicine
2006-2007	Professor of Small Animal Surgery: Kansas State University
2001-2006	Internship, Fellowship, Residency (specialist training) at the Universities of Kansas and Michigan State

### Professional qualifications/degrees

2021	ACVS Founding Fellow: Minimally Invasive Surgery (Small Animal Orthopedics)
2016	Diplomate American College of Veterinary Sports Medicine and Rehabilitation (DACVSMR)
2008	Diplomate European College of Veterinary Surgeons (DECVS)
2008	Diplomate American College of Veterinary Surgeons (DACVS)
2008	European Board Veterinary Specialization (EBVS®): Europe Specialist: Small Animal Surgery
2006	License (USA): Doctor of veterinary medicine (DVM)
2004	Doctorate (Michigan/Berlin): Dr. med.vet.
2001	License to practice medicine (Germany): Free University of Berlin: med. vet.
1993-2001	Studied veterinary medicine at the universities of Berlin, Toulouse and Munich

### Special activities

- Chairman/speaker: over 100 international and national conferences, courses and meetings
- Over 80 scientific contributions to the literature on small animal surgery
- Teacher: international working group for osteosynthesis issues (AOVET)
- Liaison: ACVS Board of Regents and the ACVS Committee for Minimally Invasive Orthopaedics
- Member of the Board of Referees of numerous professional journals: e.g. Veterinary Surgery, Veterinary and Comparative Orthopedics and Traumatology, Journal of the American Veterinary Medical Association, Canadian Veterinary Journal, Small Animal Practice
- Moderator: "Orthopedic Listserv": international forum for the discussion of orthopedic problems
- Volunteer veterinarian at various sled dog races, especially the Iditarod in Alaska

Languages: German, English, French, Spanish and Swedish

**Further information on Dr. Dirsko von Pfeil:** [Website](#) , [Research work](#)