



## INFORMATION ON CANINE EPILEPSY

Supporting those Caring  
for Dogs with Epilepsy

### THE PHYLLIS CROFT FOUNDATION FOR CANINE EPILEPSY

Registered Charity No: 1075076

Website [www.pcfce.org.uk](http://www.pcfce.org.uk)

DEDICATED TO THE LATE DR PHYLLIS GODBY CROFT OBE PHD FRCVS

## HELP, ADVICE, TIPS AND REMINDERS FOR THE OWNERS OF DOGS DIAGNOSED WITH CANINE EPILEPSY

### WELCOME

Welcome to the latest edition of The Phyllis Croft Foundation for Canine Epilepsy (PCFCE) Booklet. It is designed to give information about, and ideas and tips for those living with, canine epilepsy. We hope you will find the contents helpful, and as far as possible, reassuring.

**Note:** This booklet is not, in any way, a substitute for veterinary advice. Always consult your veterinary surgeon if you have any worries about your dog's condition.

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### THE NEED FOR CO-OPERATION - OWNER, VET & BREEDER

*"Cases of epilepsy can be successfully treated but since there are many different causes, accurate differential diagnosis is an essential first stage in therapy. The co-operation of the owner as an observer is particularly important and, in return, the veterinarian must be prepared to inform and re-assure his client. If, on the other hand, a client is knowledgeable, the veterinary surgeon must be able to give advice about breeding plans, or at least be able to direct the client to a source of expert advice."*

*("The Management of Epilepsy in Dogs" by Dr Phyllis Croft MA PhD FRCVS)*

### WHERE DO I START?

The PCFCE was founded in 1996 at a time when information and advice on canine epilepsy for pet owners was very limited. In the intervening period there has been a complete sea change. Vets are now much better informed about the condition and we have some excellent neurologists to help and advise. We even have a dedicated Epilepsy Clinic at the Royal Veterinary College. With the advent of the Internet, there are probably more pages of information than most of us could take in at the

time of first diagnosis.

**Korie Dvorak**

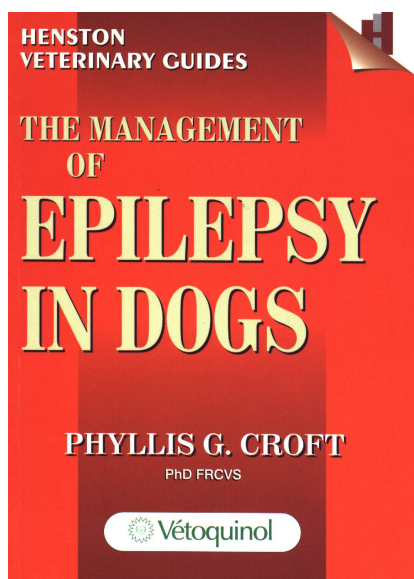


## Photo

Schnauzer Korie was owned by Roy and Kathie Dvorak from the USA. She became known to many people after the Dvorak's produced an educational video of her seizures and the family's experiences of living with them. It was not easy to watch but the video was a milestone for those of us who had never seen another dog fit and had nothing to compare our own experiences with. The information was invaluable.

Today, the internet provides hundreds of videos giving a wide variation of seizures associated with different types of epilepsy. Additionally, it is easier for owners to film their own dogs to show the vet - a very useful diagnostic tool.

It is hard to recommend a website as there are so many. When I find one I really like it gets updated and not always for the better! However, I am confident that you will never be short of information - notwithstanding the usual need for care with anything sourced from the Internet.



Books are very useful, especially when they are written by a veterinary professional but there are few aimed at the owner. We recommend *"The Management of Epilepsy in Dogs"* by the late Dr Phyllis Croft. The book was originally published in 1984 and

updated in 2000. It is still very relevant, although is not, of course, right up to date with the latest drugs. Unfortunately, it is currently out of print but please contact the PCFCE if you would like one of our remaining copies. The book provides an excellent grounding in the basics of diagnosing and treating a dog with epilepsy and Dr Croft's style makes the information readily digestible.

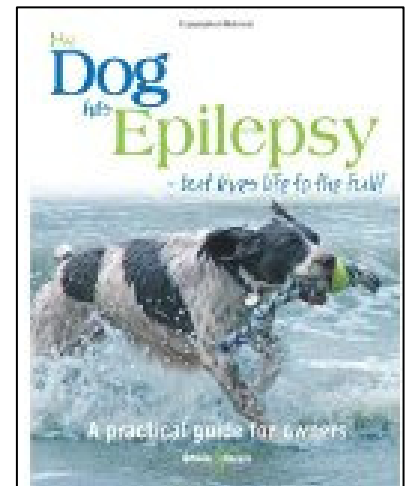
Author Gill Carrick has written **"My Dog has Epilepsy, but lives life to the full"**. It was published in December 2014 and is a glossy paperback in the (small) coffee table book style. Gill has filled it with many lovely photos of affected dogs; it is very well researched (with veterinary help) and carries much useful information for the owner. An easy read too.

## Other books

1) **"Understanding Epilepsy"** a book in the Family Doctor Series, available very cheaply from your chemist. Although written for humans, much of the information also applies to dogs and it is written in plain English.

2) The **"Ward Lock Family Health Guide to Epilepsy"**, is written in association with the National Society For Epilepsy (NSE) by Alice Hanscomb and Liz Hughes. The book is clear and comprehensive.

3) **"The Natural Way Epilepsy"** published by Element. Another inexpensive paperback (for humans) with plenty of good, readable information.



## YOU AND YOUR VET

One of the most important things you can do to help your dog is to develop a good relationship with your vet. This has to be a two way partnership. If you feel uncomfortable or he/she does not give you the time you need - ask to see a different vet or change your vet. You are the customer!

**Q:- Is my dog in pain during a fit?**

**A:-** Based on the evidence of affected humans we think a dog is not in pain during a fit.

**Recurrent seizures are a common problem in both cats and dogs, however, in many instances effective treatment is possible and as many as 90% of animals with primary epilepsy can enjoy a good quality life.**

*Dr Clare Rusbridge BVMS PhD  
DECVN MRCVS RCVS  
RCVS & European Specialist in  
Veterinary Neurology*

*"Epilepsy - Notes for veterinary surgeons" (August 1999)*

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## **IS THE CONDITION COMMON?**

Fits, seizures or convulsions are relatively common. It is not very helpful for me to give a percentage as this varies according to researcher and breed. Some breeds are known to be more at risk for epilepsy e.g. the Keeshond. Other breeds may appear to be commonly affected but the overall popularity of the breed must be taken into account.

## **WHAT HAPPENS DURING A FIT?**

<sup>1</sup> By Stewart Jennings BA, VetMB MRCVS,

Seizures are usually accompanied by a loss of consciousness. They usually follow a basic pattern of three stages:

1) **The prodromal stage** - this stage may not always be seen in some animals. Where it does happen, it can last from a few minutes to a few days before the next stage occurs. It may consist of only a slight alteration in behaviour, or can involve a period of restlessness where the dog may run around, bark, hide, salivate or vomit.

2) **The Ictus** - the actual seizure. There is a sudden increase in the tone of all muscles and the animal loses consciousness. The jaw may be clenched closed or wide open. Salivation, urination or defecation may all occur. There is often rhythmic paddling movement of the limbs. The seizure can last for a few seconds to a few minutes.

3) **Postictal stage** - after a convulsion dogs either fall asleep or remain lying down. After a few minutes most animals then stand up and may wander around restlessly often appearing deaf and blind. They often become very hungry or thirsty. They can also be unusually ag-

gressive at this stage and should be approached with care. This stage may last from a few minutes to hours or even days.

## **WHAT HAPPENS IN THE BRAIN DURING A FIT?**

### **WHAT IS A FIT THRESHOLD**

By Dr Phyllis Croft OBE PhD FRCVS

Any dog can have a fit. There are numerous poisons ranging from lead paint to slug bait which will cause any dog to have fits. Again, if a puppy chews an electric flex or strays onto an electric railway line, fits may result.

The brain contains a massive network of nerve fibres carrying messages almost continuously; the sensory ones enable the dog to see, feel, hear, smell and think whilst the motor ones enable him to use his muscles. Normally these nerve fibres are completely insulated from one another, but if the insulating coat is weak, or damaged, a short circuit can occur. It is a short circuit of this type which is the origin of a fit.

The quality of insulation varies from one dog to another and the term "fit threshold" is a short hand expression to describe the point at which a short circuit occurs. The insulation in dog A may be twice as thick as in dog B and then dog A's fit threshold might be described as twice as high as that of dog B. The dog with primary epilepsy has a fit threshold lower than that of an average dog and so he goes into a fit more easily. A dog with a high fit threshold is unlikely to have a fit. Anticonvulsants drugs such as phenobarbitone raise a dog's fit threshold. Research workers hoping to discover new and bet-

ter anticonvulsants assess their usefulness by the amount they raise the fit threshold.

## **FOCAL FITS OR SEIZURES**

By Dr Phyllis Croft OBE PhD FRCVS

This term is borrowed from human medicine and is more important in that field than in the veterinary world. It relates to the origin of the fit and implies that the fit arises from a small discrete focus in the brain rather than from a wide area.

The result is that only a part of the dog is affected and consciousness is not lost; frequently in dogs the mouth area is involved and abnormal rhythmic movements of lips, tongue or jaws occur. These movements are called clonic as opposed to a sustained muscular contraction which is termed tonic.

Focal seizures arise from a very small area of the brain where some damage has occurred and hence they are usually a manifestation of secondary epilepsy. Primary epilepsy is more common in dogs and this typically produces grand mal seizures with loss of consciousness and violent movements involving the whole body.

## **PETIT MAL FITS**

By Dr Phyllis Croft OBE PhD FRCVS

Petit Mal, sometimes called Minor Epilepsy, is not often reported in dogs but it does occur. It is quite different from Grand Mal (Tonic Clonic). The attacks only last a few seconds and the dog does not fall over or thrash about. In human medicine the attacks are often called "Absences" and this is a good description. For a few seconds

consciousness of immediate surroundings is lost and the dog is not responsive to call or to a jerk on a lead. There may be many of these absences in 24 hours but obviously, they will only be noticed by an owner who is very close to his dog.

It is unlikely that an owner will complain to a vet about Pet-it Mal so it is not easy to assess its incidence. It undoubtedly has a hereditary factor in it and in dogs, the EEG (brainwave) is very similar to that seen in human beings.

### ***EXPLAIN THE DIFFERENCE BETWEEN PRIMARY & SECONDARY EPILEPSY***

There are numerous causes of fits, including anaesthetic accidents, head injuries, drugs, toxins, tumours, infection (e.g. meningitis), disease (e.g. liver & kidney), hydrocephalus, teething or parasitic worm infections in puppies and poisoning (**secondary epilepsy**). Diagnosis requires a thorough veterinary examination of the patient and elimination of possible causes by considering history, symptoms and the results of blood tests. However, in many cases a specific cause cannot be found and the dog is then diagnosed as having **primary** (or idiopathic IE) **epilepsy** which can be hereditary.

In idiopathic epilepsy we used to say that first fits usually occur between the ages of 6 months and 5 years of age. However, this range is becoming less important as a marker since neurologists are increasingly reporting IE in dogs outside this age bracket. Certain breeds are more prone to it than others. It can, however, appear in any breed.

In difficult cases, an owner can be referred to a neurologist for further investigations such as an MRI (Magnetic Resonance Imaging) scan or a spinal tap (Cerebrospinal fluid or CSF tap).

*An animal is an epileptic only if it suffers from recurrent fits. It is possible for a dog to have only one or a few fits due, for example, to a transient infection or poisoning from which it subsequently recovers. It would be unwise to label such an animal as an epileptic and treat it as one for the rest of its life.<sup>2</sup>*

### ***TEMPERAMENT AND EPILEPSY***

*by Dr Phyllis Croft OBE PhD FRCVS*

Recently, several owners have been concerned about changes in dogs suffering from epilepsy. The dogs have become more aggressive and the owners are wondering if this change is connected with epilepsy or with its treatment. If a dog suffers from **primary** epilepsy - that is from fits which have no obvious cause - there is no reason to suppose that the dog's nature will change. Many dogs have had fits due to primary epilepsy for 10 years or more and no change has taken place in their nature. The same can be said of human beings in a similar situation.

However, a dog suffering from fits may have **secondary** epilepsy. In this case the fits have a definite cause; they may be due to trauma as for instance, where a dog has had a head injury in a road accident; or to infection such as meningitis; or to a brain tumour; or to a biochemical disturbance associated with

diabetes; or hepatitis or kidney damage. All these conditions can cause actual damage to the brain cells which can be seen with a microscope and the damage can be progressive. Changes can occur in this situation. Hopefully damage can be repaired and the dog's condition will improve but it is also possible that the damaged area will increase and then new signs may become apparent and these could include a change of temperament.

It may well be difficult to decide whether a dog has primary or secondary epilepsy but some guidelines may help.

#### **Primary Epilepsy:**

*Onset variable but often between 1 and 5 years old*

*General health normal*

*Fits occur when the dog is relaxed or asleep*

*Related dogs may have similar fits*

#### **Secondary Epilepsy:**

*Onset at any age*

*Dog may have had a head injury - this may have been 1 - 2 years before the first fit*

*Dog has had some signs of being "off colour" in the months before the fit*

*Dog has abnormal thirst (kidney damage, diabetes)*

*Dog has had a tumour - often mammary - it may have been removed years before first fit*

Owners sometimes wonder if a change in temperament can be a side effect of the medication used to control the fits. This is a possibility but it is likely that the dog will become quieter not more aggressive. The anticonvulsants first used for dogs were originally developed for human beings. The effect of valium is somewhat variable. It is only suitable for checking status

epilepticus in canine medication and its effect should be monitored closely.

I will conclude with two short personal stories. When I was working full time as a consultant veterinary neurologist, I used to see about 10 dogs every week referred because of change of temperament and none of these had epilepsy. The other story concerns one of my own dogs or rather a bitch - left alone in my car with her young puppy. Hooligans taunted her, tapping on car windows etc. From that day she became territorially aggressive in the car and gradually in many other situations. So - if your dog seems to be changing in himself, don't worry unduly if his general health is good - he is probably behaving just like some humans do.

**Q: - Which drugs are most commonly used to treat epilepsy?**

**A:**

1) Phenobarbitone. The veterinary licensed drugs are called Epiphen® and Pexion®.  
2) Potassium bromide. This is licensed as Libromide® for use as an adjunct to phenobarbitone. Another drug in use is called Epilease® but I am not sure if it had a veterinary licence.

## **FORMING A TREATMENT PLAN**

After their dog has experienced its first fit many owners confront their vet while still feeling shocked and confused. It is difficult for them to believe that their dog has not suffered severe pain and will not die in the near future, and so they expect treatment straight away.

### **REMEMBER:**

*A fit is a sign of an underlying problem not a diagnosis in itself. Just as for example lameness is a sign which may be caused by e.g. a broken bone, a muscle strain, a cut pad or arthritis.*

This makes their vet's actions hard to understand - often if the first fit has not been severe no treatment is given.

For an animal to be called an epileptic it has to have recurrent fits. It would be unwise to put a dog straight onto anticonvulsant drugs when the fit may be an isolated incident. If the fits do recur, but are mild and infrequent (many months apart), it may also be best not to put the dog onto anticonvulsants but to save them for future use. Some dogs become gradually resistant to the effects of anticonvulsant drugs and increasing doses have to be used; so the longer their use can be delayed the better.

The decision to instigate any treatment strategy with anticonvulsants depends upon many individual factors and should not be taken on the spur of the moment. It is better to take time so that the owner can understand the problems more fully, the vet can investigate the causes, and some discussion can take place between them. Therapy can then be initiated at the optimum time for the dog and not merely to alleviate the panic an owner may feel.

What treatment is available for epilepsy? Treatment can be divided into two types; firstly, if your vet has been able to diag-

nose the cause he may be able to treat it; secondly symptomatic treatment of the fits by anticonvulsants can be instituted as and when necessary.

### **Treatment of the underlying cause.**

In certain cases where your vet has been able to diagnose the cause of the fits he may be able to act directly against it. For example by the use of antibiotics against infections, diuretics against hydrocephalus, wormers against parasitic infestations or changing the diet in kidney disease. Unfortunately the number of cases in which this can be done is limited and often the damage has already been done.

### **Treatment of the fits with anticonvulsants.**

For most dogs anticonvulsant drugs are the treatment of choice, but they are not given automatically - only when necessary. The most common drugs in use are phenobarbitone and KBr but other drugs or combinations of drugs may also be prescribed. By various means all anticonvulsant drugs decrease the chance of a fit occurring by increasing the threshold to fits, or decrease the size of the fit by stopping the spread of the discharge.

There are four very important points to remember -

### **There is no fixed dose rate for any anticonvulsant.**

Teamwork and co-operation are required to determine the correct dose rate of anticonvulsants. When medication is given by mouth and the site of action is in the brain, many factors such as absorption and transport affect the result; hence



***If your dog is medicated make sure that drugs are given at set times, e.g. 8.00am and 8pm for 12 hourly medication such as phenobarbitone.***

***Missed doses can mean poor control for your dog's fits/seizures.***

a certain amount of trial and error is inevitable. Even the selection of the ideal anticonvulsant cannot be forecast with certainty and every patient must be considered as an individual case.

**An anticonvulsant must be given regularly, not just at the time of the fits.**

Oral medication usually takes at least several days to reach therapeutic levels and so seizures may still take place shortly after medication is instituted. Once on an anticonvulsant drug, medication must then be continued on a regular basis. Any change in medication must be made gradually on the advice of your vet. The sudden discontinuation of anticonvulsants in epileptic dogs will often precipitate a series of seizures or even status epilepticus.

**In almost every seizure disorder, even those well controlled, some relapses will occur.**

An anticonvulsant will not necessarily control the fits completely because a high dose rate could produce severe side effects but medication should reduce the frequency and/or severity of fits.

**Anticonvulsant drugs may produce certain side effects.**

The most common of these is poor co-ordination, which usu-

ally wears off after a few days. If it persists the dose may be too large and you should contact your vet. Other possible side effects are increased thirst and sometimes, increased hunger. These effects usually decrease after a few weeks. If you feel medication may be causing any ill effects to your dog other than these, contact your vet for advice - do not just discontinue use of the drug.

In some dogs drug tolerance may occur and ever-increasing doses are needed. This is undesirable because of the possible side effects. The ideal scheme is to find a drug and dose which control the fits to an acceptable frequency. In some cases it may be possible to reduce the dose or eventually withdraw it altogether. The dog can then be left without medication until the fits recur at sufficiently short intervals to warrant further therapy. With this regime the dose can be kept low enough to avoid serious side effects. Many dogs suffering from epilepsy live a normal life span if treated in this way and finally die from some other cause.

### **TRIGGERS**

An article in "You" magazine stated that half of those people suffering from epilepsy have an identifiable trigger for their seizures. These included food sensitivity, changing hormone levels, low blood sugar, certain drugs, parasites, noise etc. In relation to epileptic dogs, heat can have an effect and I suspect a drug given to my own dog may have triggered a bout of fitting.

### **KINDLING**

Dogs that fit frequently will

need to be medicated with anti-convulsant drugs. Failure to medicate in this situation can risk increased seizures due to kindling (see explanation below), although neurologists are not in agreement about the occurrence or frequency of this phenomenon.

An easy to understand explanation of KINDLING comes from Jean Collinson.

*If there has been a heavy snowfall, it's difficult to break a path the first time you walk through it. The second time you walk through it, it's much easier as the trail is already there. Each time you follow that path, it becomes easier as each time you go through, you trample it down more and make it a bit wider and easier to follow.*

*It's pretty much the same for seizures and for kindling. The kindling in effect creates a pathway and each seizure makes it wider and easier for the next seizure to follow that pathway. Using a drug like pheno, keppra or potassium bromide is an attempt to refill that pathway or block it, making it difficult to travel that way again. Please understand this is not an official medical definition of kindling....just the way it was told to me to make it more understandable.*

### **STATUS EPILEPTICUS**

**By Dr Phyllis Croft OBE PhD FRCVS**

This term describes the state of a dog which is having fit after fit without any intervening periods of consciousness. This condition is often preceded by serial epilepsy, which is the term used to describe a prolonged series of fits with brief periods of consciousness in between seizures.

Both these conditions are dangerous and any owner who

thinks his dog is or may soon be in status epilepticus, should contact his veterinary surgeon immediately and seek advice. If the fits of status epilepticus are not checked, coma may develop together with high temperature and this almost always leads to death.

Some dogs are more likely to go into status epilepticus than others; they are said to have a low fit threshold. The condition is most commonly precipitated by a sudden change in the barbiturate (phenobarbitone) concentration in the brain. This can obviously happen if an owner forgets to give the regular dose but it can also happen if the dog's ability to absorb food is impaired, perhaps because of diarrhoea or vomiting. Occasionally, medication being given for another condition (e.g. arthritis) may affect absorption of anticonvulsants metabolised by the liver.

Treatment must be given by a veterinary surgeon as an injection will be necessary and the dog's condition must be carefully monitored. The traditional treatment for this condition has been paraldehyde or one of the barbiturate family. Recently, valium has been used but in many cases it has not proved very satisfactory. It was after all, developed for a quite different purpose in human medicine. Provided that a bout of status epilepticus is treated successfully, it is quite possible for a dog to live years without further crisis.

## **DRUG TREATMENTS**

Not all dogs will require drug treatments but if they do it is helpful to know about the various treatments available. Your vet will, of course, advise you

but here is an overview of some of the drugs in current use.

### ***Phenobarbitone***

Phenobarbitone is the drug most used in dogs. For many years, cheap human drugs were used. There are now two veterinary licenced preparations, Epiphen® and Pexion®. (See page 9 for an article on Pexion).

Epiphen® tablets come in two sizes 30mg & 60mg but dogs under 12kg can be medicated with Epiphen® solution as the manufacturer advises against cutting tablets. Dosage will be decided by your vet but is divided and administered twice daily. It will take up to two weeks for the drug to become effective and the levels of the drug in the blood should be regularly checked until an effective dose is found. This test is known as a phenobarbital serum concentration level check.

Your vet will be looking for a concentration level of between 15micrograms/ml of blood and 45 mcg/ml. Concentrations lower than 15mcg may be ineffective whilst concentrations higher than 45mcg may cause liver damage. Blood samples should be taken shortly before the next dose is due when levels in the blood are lower.

Side effects include polyuria (excessing peeing) and polydipsia (excessive thirst) and these usually wear off after a couple of weeks. Excessive hunger is often reported by owners. Although not mentioned on the Epiphen® data sheet, another common problem can be excessive sedation but this will usually pass. However, waiting for it to do so can be distressing time for the owner who will not enjoy seeing his/her dog looking

sleepy and unsteady.

Phenobarbitone should not be given to dogs with liver problems. Regular evaluation of the liver (every) 6 to 12 months is advised as the drug is metabolised by the liver which will make it work harder. The drug should only be withdrawn under veterinary supervision and then only slowly to avoid precipitating seizures.

### ***Refractory Epilepsy***

When phenobarbitone and/or potassium bromide fail to control seizures, vets can use other drugs. I am researching up to date information on these to include in a future booklet but will cover them briefly here.

### ***Levetiracetam (Keppra®)***

Keppra was first approved for human treatment but is now proving useful for dogs. It can be used in combination with other drugs, especially phenobarbitone as it is mostly excreted by the kidneys and therefore does not put extra strain on the liver, making it, especially useful in dogs with liver problems. As well as oral dosing it can be given intravenously and intramuscularly in cases of cluster seizures. The main problem with this drug is the cost but it appears to be well tolerated by dogs.

### ***Zonisamide***

This drug is not currently widely used by our members so I have little experience of it. It requires twice daily dosing. Most of the drug is excreted by the kidneys although some hepatic metabolism occurs. Side effects are sedation, ataxia (wobbliness) and loss of appetite.



## RECTAL DIAZEPAM

By Dr Clare Rusbridge PhD  
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European Specialist in Veterinary Neurology

Administering diazepam (Valium) via the rectum was developed as a safe, affordable, at home treatment of cluster seizures. A veterinary hospital in the USA found that a major cause of client dissatisfaction and pet euthanasia was repeated expensive emergency treatment for status epilepticus or prolonged recurrent seizures. They found in a study of 11 dogs, that if diazepam was administered via the rectum after the first generalised seizure and after the second and third, if they occurred within 24 hours, then the number of seizures per cluster decreased; there was decreased likelihood of status epilepticus and the pets were less likely to be hospitalised.

### Method

In the USA study injectable diazepam was used. The drug is drawn up into a syringe, the needle removed and the syringe connected to a cannula. The cannula is inserted 2cm into the rectum and the syringe plunger depressed. It is then advisable to flush the cannula with sterile water. Owners were advised to contact their vet after the fourth seizure; if the pet was very depressed, or if there was bleeding from the rectum. The dose rate used in the study was 0.5mg/kg, which is the standard dose rate for injectable intravenous diazepam. However, the study acknowledged that dogs receiving phenobarbitone are better at breaking down diazepam and in these patients up to 2mg/kg may be required.

As some members of the PCFCE will testify, it can be difficult to draw up the required amount of diazepam and follow the method above when your pet is thrashing around beside you. A simpler method is to use the specially designed rectal tubes that are normally reserved for humans. These come in 5mg or 10mg sizes (Lagap Pharmaceuticals Ltd, Borden Hants) and are available on prescription from pharmacists.

### Why rectal diazepam?

Administering diazepam *per rectum* has several advantages. The most important being that blood from the rectum, unlike from the rest of the gut, does not go directly to the liver. The liver functions as a detoxifying factory and very efficiently removes diazepam from the circulation. This means any diazepam taken by the oral route i.e. swallowed, is broken down before it even reaches the brain. The other advantage is that it can be given during or after a seizure when your pet is not able to swallow other medication. Some owners of epileptic dogs take a supply of *per rectum* diazepam on holiday when they feel that it would be difficult to find/get to a vet if their pet had a prolonged seizure(s).

### Does it work?

*Per rectum* diazepam is useful, but at best it only reduces the number of seizures in a cluster, it doesn't stop them altogether. If your dog has 9 seizures rather than 15 it still seems like a lot of seizures! However, if your dog is at risk from status epilepticus it is probably the only drug that an owner can give safely and in such circumstances it may save a dog's life.

### Reference and further reading

Podell, M (1995) *The use of diazepam per rectum for the acute management of cluster seizures in dogs.* Journal of Veterinary Internal Medicine 9 pp 68-74

## PEXION® (Imepitoin)

Pexion is an anticonvulsant drug manufactured by Boehringer - Ingelheim and launched at the beginning of April 2013. I have put some information together and will update it as I hear more but as always you should check with your vet.

- Pexion is a prescription only medication designed to reduce seizures.
- Tablets are oblong, white and carry the logo "I 01" for 100mg and "I 02" for 400mg tabs. They are scored for cutting and supplied to the vet surgery in 100 or 250 tablet bottles. Pexion is not a controlled drug and I hope clients will, therefore, be able to buy it in larger doses to save money on dispensing fees.
- The active ingredient is imepitoin (*no relation to phenytoin*) which does not have a bitter taste. It is described as a new chemical entity and has not been used in humans. Other ingredients are microcrystalline cellulose, hypromellose, lactose mono-hydrate, sodium starch glycolate, magnesium stearate and purified water all of which have been used in other oral veterinary medicines.
- The drug is eliminated in the faeces and is reported as being safe for the liver. However it should not be used in dogs with severely impaired liver, kidney or heart function.
- Requires only a short time to get into the system (up to one

week).

- Has to be given twice daily although the company say that missed doses should be left until the next dose is due. The company have assured me that this is correct.
- The dosage requires monitoring initially but when the therapeutic dose is reached, no further level checks are required.
- The company has assured me that problems with side effects are going to be less than with other anticonvulsant drugs. Side-effects that have been reported include increased hunger, thirst, activity levels and mild gastrointestinal upsets. The company says that if any of these do occur, they usually go away over time.
- The European Medicines Agency has a fuller list of side effects but it is very important to remember they have to list everything. How many times have you read a human drug information leaflet and wondered what to do?

*Mild and generally short-lived side effects with Pexion were polyphagia (excessive eating), hyperactivity, polyuria (increased volume of urine), polydipsia (excessive water intake), somnolence (sleepiness), hypersalivation, emesis (vomiting), ataxia (inability to coordinate muscle movements), apathy (lack of interest in surroundings), diarrhoea, prolapsed nictitating membrane (protrusion across the eye of the 'third eyelid'), decreased sight and sensitivity to sound. For a full list of all side-effects reported with Pexion, see the package leaflet.*

- Toxicity testing has been carried out and the main problems occurred in dogs on very high doses – much larger than would normally be given. Stud-

ies have shown, however, that side effects were reversible after 6 weeks off the drug except for those dogs on the highest drug doses.

- Pexion has not been evaluated for use in status epilepticus or cluster seizures and is not advised as the primary treatment in these cases.

The drug website only gives basic information whilst that provided by the European Medicines Agency is much more detailed and well worth reading but do keep an open mind – as I have said they have to include all possibilities. After a study of 226 dogs the efficacy of Pexion was very slightly less than phenobarbitone but with fewer side effects.

Please note that this article is for information only. As always, you should consult your vet for definitive information.

My source was

[http://www.emea.europa.eu/docs/en\\_GB/document\\_library/EPAR\\_Public\\_assessment\\_report/veterinary/002543/WC500140842.pdf](http://www.emea.europa.eu/docs/en_GB/document_library/EPAR_Public_assessment_report/veterinary/002543/WC500140842.pdf)

This admittedly rather long document is full of information.

### **ADJUNCTIVE THERAPY FOR REFRACTORY CANINE IDIOPATHIC EPILEPSY**

Gabapentin has been in regular use in treating epilepsy in American dogs. I need to get more information but have had the following article stored in my archives for **BRAINWAVE**. The drawbacks with the drug include frequency of dosing and, as so often happens these days – cost.

Clinicians at the Animal Health Trust completed a study into the efficacy of Gabapentin as an adjunctive (*add on*) therapy for the

management of refractory (*difficult to control*) epilepsy in dogs. Gabapentin has been used as an add on therapy in human epileptics refractory to the combination of phenobarbitone and potassium bromide (KBr). It has an elimination half-life of approximately 3-4 hours in dogs, and although should ideally be administered every 6 hours, efficacy has been demonstrated with three times daily dosing. Contrary to the situation in humans, gabapentin is metabolised by the liver in dogs which puts this species at risk of hepatotoxicity especially when gabapentin is administered with phenobarbitone; however, this has not yet been documented. In a study of 11 dogs, 45% demonstrated improved seizure control with success based upon a 50% reduction in seizure frequency.

The study included 11 dogs with refractory idiopathic epilepsy showing generalised tonic-clonic seizures. Underlying causes were investigated using Cerebro Spinal Fluid tap (CSF) and Magnetic Resonance Imaging (MRI) examination of the brain.

All of the dogs were receiving a combination of phenobarbitone and potassium bromide and had therapeutic serum concentrations of these drugs. Each dog received oral gabapentin for a minimum of three months at an initial dose of 10 mg/kg every 8 hours.

Five dogs showed a significant reduction in seizure frequency (ie seizures reduced to less than 50% per week). However, many dogs still exhibited multiple days on which there was cluster seizure activity.

Gabapentin was well tolerated – five dogs exhibited mild side effects (ataxia, loss of bodily control, and sedation). One dog developed sterile panniculitis after 18 months but this resolved once gabapentin the treatment stopped.

This small study indicates that gabapentin may reduce seizure frequency in some dogs with refractory idiopathic epilepsy. A larger study is warranted to further evaluate the potential benefits of gabapentin in epileptic dogs.

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Radulovic LL, Turck D, von Hodenberg A, et al (1995) **Disposition of gabapentin (neurontin) in mice, rats, dogs, and monkeys.** Drug Metab Disposition 23, 441-448. - [PubMed](#) -  
Vollmer KO, von Hodenberg A, Kolle EU (1986) **Pharmacokinetics and metabolism of gabapentin in rat, dog and man.** Drug Res 36, 830-839. - [PubMed](#) -

### **MORE ON GABAPENTIN**

(Extracted from the website <http://www.canine-seizures.freesevers.com/gabapentin.htm>)

In people, Gabapentin, is well tolerated, is not metabolized by the liver and has few interactions with other anti-epileptic drugs, however, Gabapentin is partially metabolized to N-methyl-gabapentin in the liver of dogs.

The major disadvantages of this medication in veterinary medicine are the short half life and the cost of the medication. Clinical studies evaluating the use of Gabapentin are not currently available, however, some veterinarians feel that Gabapentin may be beneficial in controlling focal seizures refractory to other medications.

#### **Gabapentin Facts:**

**Mean Elimination Half-Life:** 3-4 hours

**Time to Reach Steady State Concentrations:** less than 24 hours

**Target Serum Concentration:** The therapeutic range has not been well established.

**Adverse Effects:** Veterinarians using Gabapentin state that there seem to be very few side effects in dogs. Gabapentin is not sedating. In humans side effects such as clumsiness, rolling eye movements, aggressive behaviors, anxiety, hyperactivity, depression and restlessness have been reported.

**Monitoring:** No monitoring protocols have been established.

**Cautions and Warnings:** In humans, kidney disease will increase the blood serum levels of Gabapentin.

**Discontinuing Therapy:** As with any anticonvulsant, discontinuing therapy may cause seizures to occur.

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Tilley, LP, The 5 Minute Veterinary Consult

### **LIBROMIDE® Canine Epilepsy – Finally a Licensed Solution**

*The following is an article sent to me by Rebecca George (George Public Relations) from Genitrix UK to publicise their licensed potassium bromide product.*

With canine epilepsy, a common and distressing disease, you'd expect the range of products available to treat it, includ-

ing potassium bromide, to be well-established, based on sound research and used only by well-informed veterinary staff. In fact the situation has been quite different. Until recently, there was no licensed formulation of potassium bromide available and neurology experts bemoaned the lack of clear information on the disease for non-specialist vets. Confusion reigned. The good news is that we hope a better future has been heralded by the arrival of the world's first licensed formulation of potassium bromide – a product called Libromide®.

Before talking about Libromide®, let's look at how we got to such a confusing situation in the first place. Potassium bromide for dogs has been around for many years – since before the Second World War in fact – and is used as a therapy for epileptic patients which are being treated with Phenobarbital.

So against this backdrop, the arrival of Libromide®, the world's first licensed potassium bromide formulation, is a welcome development. Launched earlier this year by Genitrix, a British veterinary pharmaceutical company, it has met all the licensing requirements. This means it has been manufactured in accordance with the EU's strict regulations and safety procedures and produced as a formulation developed specifically for dogs. It also has strong scientific back-up behind it, including what's believed to be the largest ever trial of epileptic dogs, which took place over seven years.

Importantly, because it's a licensed product, Libromide's arrival also paves the way for better information about canine

epilepsy to be made available. Medicinal claims can be made for the product, for instance, and promotional and educational materials produced to support its use.

Howard Wilder, Managing Director of Genitrix, says: "We see the launch of Libromide® as an opportunity to bring order out of the chaos which has impeded the treatment of canine epilepsy for so long. While potassium bromide was sold only as a veterinary special, not all suppliers played by the rules and animal welfare was jeopardised by the lack of knowledge among many vets, which left many epileptic dogs poorly managed.

We've invested hundreds of thousands of pounds in the development and licensing of Libromide® because we felt that canine epilepsy had, for too long, suffered from this archaic and unregulated approach to its treatment. Pet owners and veterinary staff are now able to treat dogs with a product which has been comprehensively safety screened, which has been proven to be efficacious and which has the back-up and pharmacovigilance they expect.

Certainly the initial response to Libromide® has been very positive and we believe it marks a milestone in improving understanding of and treatment approaches to this all too common disease."

*Note: Libromide® is classified as a POM-V medicine and is available in 325 mg tablets in packs of 100 and 500 tablets.*

## **POTASSIUM BROMIDE (KBr) AND DIET**

Back in 1998, I asked Clare

Rusbridge about whether diet affections the absorption of potassium bromide. Despite the passage of years the information is still very relevant today.

*Clare Writes:*

"Diet does not affect the absorption of KBr but can affect excretion. (KBr is excreted from the blood into the urine). KBr is a salt and its excretion through the kidney is affected by how much regular salt (NaCl) is in the diet. A high salt diet makes the kidneys work harder and increases excretion of KBr. This can mean that the dog may require more KBr. Dogs on a low salt diet (e.g. diets for animals with heart disease) will excrete KBr more slowly and there can be a rise in concentration of KBr in the blood. Commercial diets are high in salt to make them more palatable so if the diet is changed to one lower in salt there will be a slower excretion. If the dog is suddenly changed to this diet then the blood concentration can suddenly rise and the dog can become severely sedated.

### **Advice**

If possible choose a diet with a medium salt content so that the dose of KBr does not have to be high. If your dog takes KBR then avoid intermittent salty treats e.g. peanuts and crisps as this may make the blood concentration drop. Avoid any sudden changes in diet.

Also as KBr concentration is dependent on kidney function then care has to be taken if the dog has poor kidney function as the blood concentration may be higher than expected. The KBr will not cause kidney damage. This is most important if the dog is ever unfortunate enough

to go into acute renal failure e.g. after drinking antifreeze. Then the kidneys shut down and blood concentrations of KBR will rapidly rise and the dog can add KBr induced coma to its problems. It is important for the vet to realise that the dog has too much KBr in its system and to try to flush it out (by diuresing the kidneys).

## **KEEPING RECORDS**

*By Mandy Cliffe*

It can be extremely valuable to keep detailed records of your dog's epilepsy history even if your dog is not on medication. I have already mentioned the usefulness of videos but written records can also be invaluable for monitoring the progress of the condition in your dog. Being able to see the frequency of fits at a glance and comparing this to changes in medication will maximise the accuracy of information passed to your vet.

Anyone can request a seizure diary from the PCFCE (contact details on the front page) or download one from our website at [www.pcfce.org.uk](http://www.pcfce.org.uk).

Alternatively, Vetoquinol UK, the manufacturers of Epiphen® produce several different records that can be downloaded from [www.epiphenonline.co.uk](http://www.epiphenonline.co.uk). You can choose from a seizure report, seizure diary, seizure record, seizure chart and a medication record depending on which you think you will realistically fill in regularly.

Accurate records showing the frequency and progress of fits will help your vet to diagnose and treat and may even bring good news in that the fits are infrequent and not increasing in number.





## **PHENOBARBITONE OWNER INFORMATION SHEET**

Seizures are caused by abnormal electrical discharges from nerve cells in the brain. Phenobarbitone suppresses seizure activity by reducing the electrical charge within these cells.

### **How much phenobarbitone should my dog have?**

The starting dose is normally 2-3 milligrams (mg) for every kilogram (kg) body weight twice daily. Most dogs will require 3mg/kg twice daily to control seizure i.e. a 30kg Golden Retriever will receive 90mg twice daily. In some cases your vet will build up slowly to this dose.

The dose required to control seizures varies greatly between individuals. What is important for seizure control is the concentration of drug in your pet's blood (see below). Every dog breaks down and gets rid of the drug at a different rate. Phenobarbitone must be given every 12 hours otherwise the concentration of drug in the blood may dip making your pet more prone to seizures.

It does not matter whether phenobarbitone is given with food or between meals. What is important is that it is given at a regular time each day so that doses are never forgotten.

Phenobarbitone therapy should not cease suddenly otherwise your pet may have 'withdrawal seizures'.

### **Why does my vet need to take blood samples?**

The concentration of phenobarbitone in the blood is normally measured by taking a blood sample 10-14 days after starting treatment. Blood levels should also be assessed every 6-12 months or 2 weeks after a change in dose, and at other times where seizure control is poor, for example, if there is an unexpected seizure. Some vets like to measure the lowest blood levels of phenobarbitone (usually just before a dose is due) but these "trough" concentrations are not essential. However, it is good practice to always

- 1) use the same laboratory to test the samples
- 2) obtain the blood samples at the same time after medication
- 3) fast your dog for at least 12 hours before collection of a blood sample. Lipaemia (fat in the blood) can affect results.

Blood concentrations should be at least 100µmol/l or 20 mg/l to control seizures in most dogs. If the seizures are still not adequately controlled (clusters of >3 seizures or seizures occurring more frequently than every 6 weeks) when the phenobarbitone serum concentration is 25-28mg/l (120 -140µmol/l) then your vet may want to consider adding or changing to another drug.

### **What side effects can phenobarbitone cause?**

### ***Sedation and poor co-ordination***

This is normally seen at the start of therapy, after increases in doses, or with the addition of another drug e.g. bromide. This effect typically wears off within two weeks. If it doesn't or is excessive then your vet may advise that you reduce the dose of phenobarbitone or switch to another drug.

### ***Increased urination and drinking***

Phenobarbitone acts like a diuretic. Your pet must always have access to water when on phenobarbitone treatment otherwise they can get dehydrated. Some animals on high doses may have wet in the house overnight or when left for extended periods.

### ***Increased appetite***

Phenobarbitone therapy can increase your pet's appetite however they often do not require more food. Weight gain can be a difficult problem to avoid. It may help to feed a lower calorie food so that your pet can eat more without gaining weight. Extending mealtimes for example by using a Bustercube <sup>TM</sup> (<http://www.bustercube.com>) can also be helpful.

### ***Liver damage***

This is a frequently talked about problem in animals on anti-epileptic medication, but in reality it is rare. Phenobarbitone is processed in the liver which can be damaged as it breaks down

phenobarbitone. This may happen in two circumstances:

1) The animal is unusually sensitive to the drug (so called idiosyncratic reaction) unfortunately this is impossible to predict.

2) There is pre-existing liver disease. For this reason blood samples are normally taken to check liver function prior to starting therapy and periodically (usually every 6-12m) whilst on therapy.

Excessively high doses of drug are given over the prolonged period. The author advises against maintaining a serum concentration greater than 30mg/l or 145µmol/l or a dose greater than 12mg/kg/day.

### ***Pancreatitis***

Epileptic dogs are at greater risk of pancreatitis – i.e. inflammation of the pancreas. Pancreatitis may result in clinical signs such as vomiting and anorexia and in severe cases can be life-threatening. It is likely that there are multiple risk factors for this disease which may include obesity, persistently high resting triglyceride, a high fat diet, a tendency to scavenge and high doses of phenobarbitone combined with bromide.

### ***Blood cell abnormalities***

Extremely rarely phenobarbitone may induce problems with blood cell production / destruction. If you are concerned about your pet in any way after they have been prescribed phenobarbitone then contact your veterinary surgeon.

### **NOTE**

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## **BROMIDE - OWNER INFORMATION SHEET**

Seizures are caused by abnormal electrical discharges from nerve cells in the brain. Bromide suppresses seizure activity by reducing the electrical charge within these cells.

### **How much bromide should my dog have?**

Bromide is normally given as a potassium salt and is available in liquid, capsule or tablet form. Potassium bromide should be given with food and is normally given once daily in the evening, or divided into two daily doses.

The starting dose is normally 30-40 milligrams (mg) for every kilogram (kg) body weight daily. For example a 30kg Golden Retriever could receive between 900 and 1200mg per day. In some cases your vet will recommend “loading” your dog with an initial higher dose to help get blood concentrations to active levels more quickly.

Your vet will need to calculate the final dose your dog needs depending on the concentration of bromide in your pet's blood (see below). Every dog gets rid of the drug at a different rate.

There are other factors that may affect the dose of bromide that your dog requires. A high salt diet means the drug will be eliminated more quickly, the converse is also true, and changing your dog's diet may increase or decrease the amount of bromide in their blood.

Therefore, changes to the diet should be made gradually (over at least 5 days) and blood concentrations of bromide should be rechecked every time diet is altered (especially if the dog be

comes sedated or has unexpected seizures). Most diets have a similar salt content - with the exception of home cooked diets and prescription diets for heart disease (low salt) or for urinary stones (some are high salt).

Blood concentrations of bromide can also increase if a dog becomes severely dehydrated, e.g. following severe or bloody diarrhoea. If your dog appears more sedated the bromide dose may need to be temporally withdrawn or reduced.

It takes a long time for bromide to be removed from the body so it can be safe to miss a single dose (under veterinary guidance). However in normal circumstances bromide therapy should not cease suddenly otherwise your pet may have withdrawal seizures.

### **Why does my vet need to take blood samples?**

Blood concentrations of bromide should be assessed 8-16 weeks after starting the drug. Ideally blood levels should be measured around 16 weeks after treatment starts as it takes 4 months for blood levels to stabilise after the drug is started. The author aims for a concentration of ~ 1000mg/l (15 mmol/l) - 2000mg/l (25mmol/l). Higher blood concentrations are acceptable if there are no adverse effects e.g. sedation. Blood concentration of bromide should also be assessed every 6-12 months, 8-16 weeks after a change in dose and if there is a breakdown in control (i.e. unexpected seizures). Some vets like to try to measure the lowest levels of bromide in the blood (usually just before the next dose is due). However these



"trough" concentrations are not essential. It is however, good practice to always

1. use the same laboratory for testing samples
2. obtain the blood samples at the same time after medication
3. fast your pet for at least 12 hours before a blood sample is taken. Lipaemia (fat in the blood) can greatly affect bromide results and if excessive the assay cannot be performed

If seizures are still not adequately controlled (clusters of >3 seizures or seizures occurring more frequently than every 6 weeks) when the bromide serum concentration is greater than

1500mg/l (20mmol/l) then your vet may want to consider adding or changing to another drug.

### **What side effects can bromide cause?**

#### ***Sedation and poor co-ordination***

This may be seen at the start of therapy, after increases in doses, or with the addition of another drug (especially phenobarbitone). This effect typically wears off within a week. If it doesn't, or is excessive, then your vet may advise reducing the dose of bromide or switching your pet to another drug. If the dog is drowsy shortly after dosing then try giving the medication last thing at night. Splitting the dose i.e. giving twice daily can also reduce sedation in some dogs.

#### ***Increased urination and drinking***

Bromide acts like a diuretic. If your pet is receiving bromide

they must always have access to water otherwise they can get dehydrated. Some animals on high doses may wet in the house overnight or when left for extended periods.

#### ***Increased appetite***

Your pet is likely to have an increased appetite when they are on bromide therapy, however this does not mean they require more food. Weight gain can be a difficult problem to avoid especially if your dog is already on phenobarbitone. It may help to feed a lower calorie food so that your pet can eat more without gaining weight. Extending mealtimes for example using a Bustercube<sup>TM</sup> (<http://www.bustercube.com>) may also be useful.

#### ***Gastrointestinal disease (vomiting and diarrhoea)***

Also see "pancreatitis" below. Potassium bromide is a gastrointestinal irritant and should be mixed with food. Some dogs are unable to tolerate it - although in this instance it is worth trying a different formulation e.g. liquid instead of tablets.

#### ***Pancreatitis***

Epileptic dogs are at greater risk of pancreatitis - i.e. inflammation of the pancreas. Pancreatitis may result in clinical signs such as vomiting and anorexia and in severe cases can be life-threatening. It is likely there are multiple risk factors for this disease including obesity, persistently high resting triglyceride, a high fat diet, a tendency to scavenge and high doses of phenobarbitone combined with bromide.

#### ***Skin disease***

In humans bromide may cause skin changes - so called 'bro-

mism' - and this is one of the reasons this drug is not used for people. It does not appear that this syndrome occurs in dogs, however dogs with pre-existing skin disease e.g. atopy may be itchier when receiving bromide and in some cases it may not be advisable to use this drug.

#### ***Liver function***

Bromide does not require liver metabolism and is one of the few "liver safe" anti-epileptic drugs.

#### ***Kidney function***

Kidney function may also affect bromide elimination. This is only a problem if the pet develops acute kidney failure. In this situation the kidneys shut down and the bromide concentration rises and literally anaesthetises the pet. In this circumstance your vet will give your dog fluids and diuretics to flush the bromide out of circulation. Bromide does not damage the kidneys.

#### ***Cats and bromide***

Bromide results in lung disease in 50% of cats that receive it and therefore is not a recommended therapy for this species.

Note

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**Clare Rusbridge, December 2007**



## **THE JOURNEY OF AN ANTICONVULSANT**

*By Dr Phyllis Croft OBE PhD FRCVS*

♦ If an epileptic dog is to have a long life of good quality, he/she must be a member of a team, the other members being a vet (or vets) and the owner; like any other team, results will depend on the members communicating easily with each other. Many owners might be surprised to learn that the biggest reason for failure in treatment of canine epilepsy is the lack of administration of the prescribed drug (Marcinczyk 1995).

It seems likely that this is due to lack of communication between the members of the team rather than wilful neglect on the part of the owner. It is easy for a vet to forget that words like anticonvulsant, interictal period and metabolism may mean nothing to an owner, particularly one who is shocked by learning his/her dog is epileptic. Likewise, an owner may be too bewildered to think out the right questions to ask the vet who is obviously busy. The remaining member of the team, the dog, will probably be too occupied in defending him/herself in these strange surroundings or in escaping, to give a reliable picture of him/herself.

There are two separate problems which need explanation when a dog is first receiving treatment for epilepsy:

- i) delay in initial effect
- ii) mode of action of an anticonvulsant

### **Initial Delay**

♦ Most anticonvulsants when

given by mouth take 2-3 weeks (2-3 months for KBr) to build up a sufficient concentration to affect fit frequency. During this period, the dog may well continue its usual fit pattern - say one fit every few days - and the owner should not assume the anticonvulsant is not working and stop giving it to the dog. If after 3-4 weeks, the interval between fits is not getting longer, then the owner should communicate with the vet, but administration of the anticonvulsant must continue until the vet changes the programme. Even if the anticonvulsant does not seem to be doing anything, any sudden changes in the level in the brain could precipitate continuous fitting; this is known as status epilepticus and is a life threatening situation demanding immediate veterinary attention.

### **Mode of action of an anticonvulsant**

♦ It is not always easy to realise that a tablet or liquid put in a dog's mouth has to make a long journey to reach the brain and as with the journeys we humans make, delays can occur at many points on the way and affect the overall journey time.

The tablet passes quickly to the stomach but it may be held up there by a mass of food from a recent meal or it may go straight through. Then it reaches the absorption area of the gut and sooner or later passes out of the gut into the blood stream; it is worth mentioning that if a dog has diarrhoea, the tablet may pass along this part of the gut so fast that it cannot be absorbed and its effects are greatly reduced. Eventually the bloodstream will carry the anticonvulsant to the brain but the time

for this part of the journey will depend on the many factors which affect the circulation such as heart action, blood pressure, temperature, muscular activity and many others.

Various chemical changes may be necessary on this journey and when the medication finally reaches the brain, it still has to cross the blood-brain barrier before it can exert its effect. The permeability of this barrier varies, particularly if an infection is present.

The aim of successful treatment of an epileptic dog is maintenance of a constant level of anticonvulsant round the cells in the brain so that they do not fire erratically and produce the electrical storm that we see as a fit. If the level is too high, the dog will be half asleep and unable to move safely; if the level falls suddenly, status epilepticus may occur and the dog's life could be in danger.

Everything in a living being is continually being changed - used and replaced; so that the anticonvulsant brought to the brain is used and the remains carried away and a fresh supply is needed. A continuous stream of the right amount will maintain a relatively stable environment for the brain cells and this is the ideal at which the team is aiming.

All the foregoing cannot be explained to an owner who has just been told their dog is epileptic and has perhaps a horrific memory of a big dog having a fit in the lounge and knocking the coffee table over. So the teamwork is needed with somebody from the Practice contacting the owner after a few days, when problems can be sorted and information exchanged.

Hopefully, before any crisis occurs, the owner will have understood that it is vital to give the anticonvulsant at regular intervals - it may be once, twice or thrice in 24 hours - and to give it punctually so that the level in the dog's brain remains as constant as possible. There are many variables in the journey time of the anticonvulsant from mouth to brain but at least the start of the journey can be accurately controlled. If a dose is forgotten there is a risk of sudden lowering of the drug concentration round the brain cell and of status epilepticus.

The aim in treating a dog with epilepsy is to stabilise it on as low a regular dose of anticonvulsant as possible. All anticonvulsants have undesirable side effects; some of them, such as increased appetite, thirst and urination are usually short term but others such as liver damage develop slowly and are permanent. This means the intake should never be higher than is necessary for the control of fits. A high dose rate can sometimes be brought down, but this must be done very gradually following a scheme worked out by the vet and owner together. Sometimes it is necessary to change the anticonvulsant; this again must be done slowly, interleaving the new drug with the old over a period of weeks. Every dog is different so it is not possible to forecast the most effective anticonvulsant or the optimum dose rate. The only way to get a good result is for the team of vet owner and dog to work together and communicate frankly with each other. There is no reason why a dog's life span should be curtailed because of epilepsy; many dogs have a life of good quality for

many years after being diagnosed as epileptic.

### **WHAT TO DO WHEN YOUR DOG IS HAVING A FIT <sup>4</sup>**

*By Stewart Jennings BA, VetMB, MRCVS*

The main thing is not to panic! The fits are more alarming to you than the dog because the dog is unconscious and feels nothing. Approach the animal with care. Roll him/her on a blanket away from furniture and drag clear of any harm for example an open fire or a staircase. Observe the patient well as your observations can be of great assistance and help the veterinary surgeon to make a diagnosis. It is usual for convulsions to settle after two or three minutes and recovery is usually complete in minutes to hours. During this time there is little you, the owner, can do to help. Telephone the veterinary surgeon at a suitable time for an appointment to have your pet examined if this is necessary.

### **IF YOU ARE A NEWBIE**

If you are brand new to epilepsy, reading this booklet may be very worrying, especially as so much information is dedicated to drugs.

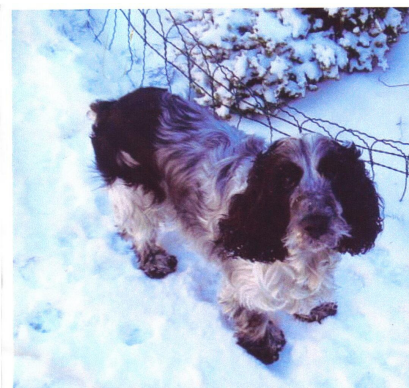
I would like to reassure you that not all dogs will need to take drugs. We have members whose dogs' only fit occasionally and remain drug free. It may also be too early in your journey to even consider drugs, (although you may want to try alternative remedies. This is a very good way to start as supplements such as skullcap and valerian available from Dorwest Herbs have helped a number of dogs).

If you are at all worried, bemused, unsure, why not call one of the numbers on the front page of this booklet and talk it over with someone who has experienced epilepsy in their own dog or even dogs. It may be a cliché but it can help to talk.

Sadly, cost is a major factor in the treatment of epilepsy these days, especially if advance diagnostics such as an MRI scan are needed. I am afraid there is very little that can be done to help with costs except being completely honest with your vet who may take direct payment from an insurance company or provide larger quantities to cut down on dispensing charges. Any owner is entitled to ask their vet for a prescription to obtain drugs from a vet pharmacy. However, the vet can charge an admin fee and this cost is not regulated. Despite our general reluctance to ask for a prescription, there are large savings to be made in some instances.

If you are struggling, ask for a neurology referral. We really do have some great neurologists in this country. Many dogs can live long and happy lives with epilepsy, especially primary epilepsy. The PCFCE has also followed the journeys of members whose dogs have had multiple cluster seizures and still come through, so there is always hope.

**Max MacPherson**

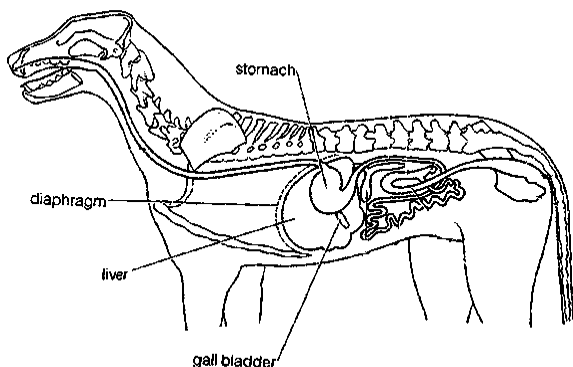


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## THE EFFECTS OF PHENOBARBITONE ON THE LIVER)

By Kate Chandler, B.Vet.Med. MRCVS, BSAVA  
Petsavers Resident in Neurology, Royal Veterinary  
College. (1 July 1997)

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(Diagram reproduced from Veterinary Notes for Dog Owners by kind permission of the editor Trevor Turner B Vet Med. MRCVS)

The liver is a very important organ and is found just in front of the stomach in the dog. It has many functions, including making important substances in the body, getting rid of toxins and breaking down (or metabolising) drugs or medicines. Phenobarbitone is one of many drugs that the liver is responsible for breaking down. When an animal is being treated with a drug such as Phenobarbitone, the liver has more work to do than usual. If animals are treated with it for a long time, especially at high doses, then the liver may suffer damage caused by extra wear and tear. However, phenobarbitone is a very useful drug and most animals tolerate it for many years without ill effect. It is therefore important that the liver is healthy when a course of phenobarbitone is prescribed and it is also advisable to monitor the liver

regularly while the animal is taking the drug.

There are many different blood tests that indicate whether or not the liver is working normally, which are described below.

### 1 - LIVER ENZYMES e.g. ALT, ALK-P

These are substances that can have HIGH levels in the blood when the liver is either work-

ing harder than usual or is affected by a specific liver disease. The levels can also be raised when other conditions such as bone or muscle problems are present. They are often raised in animals treated with phenobarbitone. This does not necessarily mean that the liver is not working well, rather it reflects the increased work being done.

### 2. - ALBUMIN

This is an important protein found in the blood and is made by the liver. If the liver is not working well the levels may be lower than usual in the blood.

### 3. - BILIRUBIN

This is a pigment that can be HIGHER than normal in animals with liver disease. This is the pigment responsible for jaundice (yellowing of the skin and membranes).

### 4. - BILE ACIDS

These can be higher than normal if the liver function is poor. Often this is a test that is done by taking a blood sample before a meal and then again two hours after a meal and compar-

ing the two results.

## NATURAL THERAPIES

By Richard Allport B Vet Med, Vet M F  
Hom MRCVS

*Richard Allport is a well-known Veterinary Surgeon who specialises in Natural therapies. He runs his own Natural Medicine Veterinary Centre in Potters Bar, Hertfordshire. The practice is a referral centre offering a wide range of treatments including acupuncture, Bach Flower remedies, crystal therapy, herbal remedies, homeopathy, etc. The following is a transcription of the talk Richard gave at the 1999 PCFCE AGM at the Royal Veterinary College.*

"I get a lot of calls from potential clients about epilepsy; usually asking "Can you cure my dog of fits?" and "Can I take my dog off conventional treatment if you give your therapies". Basically the answer is no, which is not to say that my patients aren't in remission or haven't come off conventional treatment but 99% of the animals I treat are still on conventional treatment and remain so. There are no magic cures with any natural therapy.

Natural therapies have the potential to do four things

- 1) Minimise the number of fits and lengthen the time between fits.
- 2) Reduce the possible side effects of conventional drugs, so there are liver support remedies for instance in natural therapies.
- 3) Make the pet feel better. Even if their fits are not better, I am quite certain that all the animals I treat are healthier, happier, less depressed and better in themselves.
- 4) Quite often, I can reduce the dose of the conventional treatment required. However, stop-

ping fits per se; taking them off conventional treatment altogether is unlikely though occasionally possible.

I was a conventional vet for 10 - 15 years and began to use natural therapies, then a bit of both but for the last 6 years I have been using nothing but natural therapies. Having done both, I feel that all animals with epilepsy will benefit from natural therapies but how much they benefit is completely variable. My feeling is that natural therapy is complementary to rather than alternative to, conventional treatment. Most of my patients are already on medication. I don't see many at the start of treatment as I run a referral practice.

What I want to do is give an idea of how you might approach a case rather than concentrate on specific treatments. There are many different natural therapies. The problem with epilepsy is that it is a very deep-seated problem and one single approach often doesn't do much. Most of the patients I treat are on a combination of perhaps homeopathy, herbal treatment, acupuncture and crystals. In my view using a whole range of treatments works much better. However, you can occasionally run into problems. For example, with aromatherapy, which I am using more and more, there are certain essential oils that you shouldn't give to epileptic pets. Even with homeopathy you can sometimes cause problems by giving the wrong remedy at the wrong time. Although it is often said that natural therapies are safe and can't do any harm, that isn't actually true. I worry about people going off and do-

ing their own thing. If you are thinking of using natural therapies I strongly recommend that you get a veterinary surgeon who has expertise in this field to back you up.

Most conventional vets these days are very happy about referring cases to me. It is not just a case of a client asking for a referral - they do it off their own bat. That is very pleasing after some years of being thought a bit eccentric. Conventional vets must feel that those of us who are properly trained and have expertise in natural therapies are sensible people and I think being sensible is important in natural therapies - they may be nice, natural and gentle, green and terrific, but you need to know what you are doing.

I'll run through the different therapies I use and how they can help. I use acupuncture a great deal, mainly for arthritis, joint and back problems but it has a lot of other uses. When used properly, it is a very deep acting therapy. The big problem I have is keeping the patient still for 5 - 15 minutes. As you can probably imagine some dogs and many, many cats are not particularly good patients for acupuncture. The big advantage with acupuncture in animals is that they don't need the needles in for as long as humans. Where you might give humans 20 - 30 minutes a session, with animals 5 to 15 minutes is almost always sufficient. I think it is because of the difference in metabolic rate. If you think that acupuncture is like charging a battery, humans charge up very slowly and animals with their higher metabolic rate charge up much more rapidly. Like a battery, once charged, you won't get any ex-

tra benefit from leaving the needles in. I think the difference is that animals often need more frequent sessions perhaps because with their metabolic rate the charge drops down too quickly or quicker than humans. Acupuncture, particularly in combination with homeopathy, is very effective. A number of dogs have a monthly session of acupuncture with homeopathy and perhaps herbal treatment in between times and are doing very nicely.

- There are certain aromatherapy oils you should use for epilepsy.

Oils like lavender are very calming and soothing and if used regularly will minimise the intensity of the fits though not always the frequency. Classically, aromatherapy oils are massaged into the skin. If you get a longhaired or very hairy dog you can use the groin or armpit area but it is important to dilute the oil before you massage it in. Lavender is the one oil you can use neat. We normally use what is called a carrier oil (e.g. almond oil) and a few drops of the essential oil to a teaspoon full of carrier oil is fine but a diffuser is easier to use. You can either have a candle underneath which heats up the oil to diffuse the atmosphere or you can get electric ones these days. (If you can't get to sleep at night try lavender, its wonderful, really calms you down).

Flower remedies such as Bach flower remedies can be very helpful, not so much for the fits themselves but to help what might be trigger factors. For instance, if you have a dog that is a very nervous type, hates thunderstorms and fire-



works and the fits seem to be triggered off by these sort of problems, the Bach Flower remedy mimulus is very good for fear of specific problems. If you have animals that are the very aggressive type and getting really worked up and aggressive seems to trigger a fit then holly might be a good remedy.

Herbal treatment I would say the majority of dogs I'm treating for epilepsy have skullcap & valerian. It's a nice general calming, soothing remedy. It doesn't sedate or dope the animal, just calms them down and seems to settle down that tendency for fits to get triggered off. It can be given for long periods. Most dogs and cats will not drink herbal tea so most herbs are available in tablet form these days. Things like hops and oats are very calming and soothing. (I take hops a lot in a well-known form - beer - it calms you down!) You can use hops by infusion and when you think of things like oats, a lot of bedtime drinks are made from cereals like oats and barley because they are calming, soothing.

There are several crystals which you can use around the home or on the animal. You can actually sew crystals into a holster under the collar. The two particular ones good for epilepsy are brown agate and jet. They do seem to help to reduce fits quite effectively.

I'll just mention homeopathy briefly. Phyllis Croft heard a talk given by John Saxton some years ago which implied that the problem with homeopathy was that it is so individual. This is very true. There are lots of homeopathic treatments for fits but you need to get to know your animal very well. The idea about homeopa-

thy is to take every patient as an individual and try and get to the magical constitutional remedy. This is one that fits in not just with the epilepsy but with the whole nature of the animal. If I see a patient for a first homeopathic consultation I will spend up to an hour asking questions. Not just about the fits themselves but about the whole nature and character: what they like to do, what they like to eat, whether they drink very much, whether they like to be warm or cool, if they are active and out going or introvert and shy. Once you get that information you then work out the homeopathic remedies which will suit that particular patient. I approach homeopathy in two ways, one is the so-called approach of constitution, looking at the whole patient but I can also look at their local symptoms. There are particular homeopathic treatments for the kind of fits. For animals that get very hot and over heated; they get over their fit and are still left very nervous, their pupils are dilated, and they are looking hot and bothered you might use belladonna, this is a cooling remedy. You might use ignatia for an animal where the fits tend to get triggered if they have been stressed, worried or had some big emotional upset.

So you can use remedies on that simple local basis but it won't be as effective as also using the constitutional remedy, the one that fits in with their whole nature.

#### *Listen to Richard Allport on You Tube*

You can see a short interview with Richard on You Tube. Whilst giving a patient acupuncture, he discusses his holistic approach to health care, his conversion to raw food diets and his opinions on annual vaccination.

## **ACUPUNCTURE**

By Richard Allport BVetMed  
VetMFFHomMRCVS

Acupuncture is the ancient Chinese art of inserting needles at selected points in the body. The Chinese believe that energy flows through the body along channels or meridians. By inserting needles at points along the meridians, the energy flow can be stimulated, sedated or balanced. This is the basis for treating a whole range of diseases. It is particularly applicable to arthritis, back problems and muscular and nervous disorders but can be used to treat almost any condition. Most animals tolerate acupuncture sessions very well and feel little or no discomfort. The numbers of sessions varies according to the problem being treated. An average course of treatment for a chronic arthritis might be a weekly session for 3 - 4 weeks then "top up" sessions once every month or so dependent on response to treatment. Needles are sterile and are used only once, so that there is no risk of infection to the patient. The needles are left in place for anything from 5 - 20 minutes, depending on the problem being treated. Response to acupuncture therapy is usually good, approximately 75% of patients receiving acupuncture show improvement in symptoms.

## **MILK THISTLE**

By Mandy Cliffe

The herb Milk Thistle (Silymarin) was used in human trials to see if it could help those suffering from liver damage as a side effect of anticonvulsant drugs. Whilst there is some scepticism as to the overall quality of research in general about



the herb, I would advocate its use. To find out if it is working for your dog - have regular liver function tests and compare results.

Its ability to help the liver regenerate was tested in the 1970's, when the herb was used in a study to treat poisoning from Death Cap mushrooms. Conventional treatment had a 30-40% mortality rate whilst those treated in the trial all survived. Other internet sites I checked made a number of claims for its efficacy, including in cases of colitis.

The following information was extracted from the "Herbal Information Centre" site.

Milk Thistle has been used in Europe as a remedy for liver problems for thousands of years. Its use was recorded in the first century (AD 23-79), noting that the plant was excellent for protecting the liver. Early Christian tradition dedicated milk thistle to Mary, calling it Marian thistle. In the 19th century the Eclectics used the herb for varicose veins, menstrual difficulty, and congestion in the liver, spleen and kidneys. Milk thistle has also been taken to increase breast milk production, stimulate the secretion of bile, and as a treatment for depression.

Milk thistle nutritionally supports the liver's ability to maintain normal liver function. It has shown positive effects in treating nearly every known form of liver disease, including cirrhosis, hepatitis, necroses, and liver damage due to drug and alcohol abuse. Milk thistle works due to its ability to inhibit the factors responsible for liver damage, coupled with the fact it stimulates production of

new liver cells to replace old damaged ones.

Milk thistle has been proven to protect the liver from damage. The detrimental effects of environmental toxins, alcohol, drugs and chemotherapy may be countered with this valuable herb. The active chemical component in the herb is silybin, which functions as an antioxidant and is one of the most potent liver protective agents known. Clinical trials have proven silybin to be effective in treating chronic liver diseases and in protecting the liver from toxic chemicals. An injection of silybin is a proven antidote for poisoning with the Deathcap mushroom (*Amanita phalloides*).

Silybin is a part of the chemical structure of the flavolignan silymarine. Milk thistle's hepatoprotective effects may be explained by its function of altering the liver cell membrane structure, blocking the absorption of toxins into the cells. Hepatoprotection by silymarin can also be attributed to its ability to increase the intracellular concentration of glutathione, a substance required for detoxicating reactions in liver cells. Milk thistle is also an antioxidant that is more potent than vitamins C and E.

### **SKULLCAP & VALERIAN**

This herbal remedy is used in the treatment of epilepsy by alternative veterinary practitioners. It is available directly from the manufacturers, at [www.dorwest.com](http://www.dorwest.com).

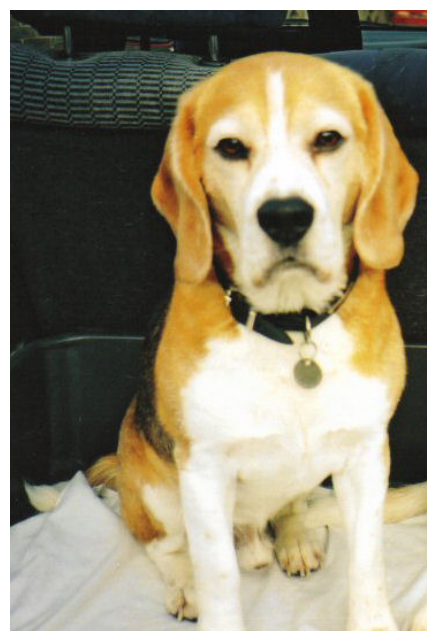
Here's what they say about the product on their webpage:

"A licensed herbal medicine for

the symptomatic relief of anxiety, nervousness, excitability and travel sickness, and an adjunct in the treatment of epilepsy in dogs and cats.

Invaluable to calm and relax dogs and cats suffering from excitability, apprehension, hyperactivity and phobias, such as those from fireworks, thunderstorms or gunfire. Does not cause drowsiness or impair normal behaviour or performance making it ideal for those needing to be settled for travelling, showing, training or obedience work. Given prior to a journey will calm nervous travelers and is useful where new surroundings or situations might cause apprehension or anxiety. In cats, this tablet is also effective to control territorial spraying as the tranquilising effect reduces the impulse to mark territory. Under veterinary supervision this tablet is used in the control of epilepsy, often in conjunction with conventional anti-convulsant drugs".

**Jacob**



## ICE PACK - A TECHNIQUE TO STOP SEIZURES

This is a surprising technique that anyone can try for easing seizures, published on the "Epi-Guardians Angels" website. The following is written by *Joanne Carson*.

"This article on using an ice pack to stop seizures is about an exciting new technique that has recently been published in a leading veterinarian journal. This technique may be able to help you shorten or even stop your dog's seizure before it begins, and may even help reduce the amount of post-ictal recovery time, and to return your dog to full functioning more quickly.

The technique was tested--both in an ER and a regular veterinary hospital as well as by people in their own homes--on 51 epileptic dogs. In all 51 cases, the technique either stopped the seizure or shortened the usual duration of the seizure, and **in many cases, the post-ictal (after-seizure) recovery time was also shortened.** These results were published in an article by H. C. Gurney, DVM, and Janice Gurney, B.S., M.A. The article is entitled, "A Simple, Effective Technique for Arresting Canine Epileptic Seizures." It appeared in The Journal of the American Holistic Veterinary Medical Association, in the January-March 2004 issue, pages 17-18.

Probably the most exciting part of this discovery is that the technique is not in any way harmful to your dog and it

does not involve giving extra medications. It is as simple as applying a bag of ice to the lower midsection of your dog's back (the small of the back), and holding the bag firmly in posi-

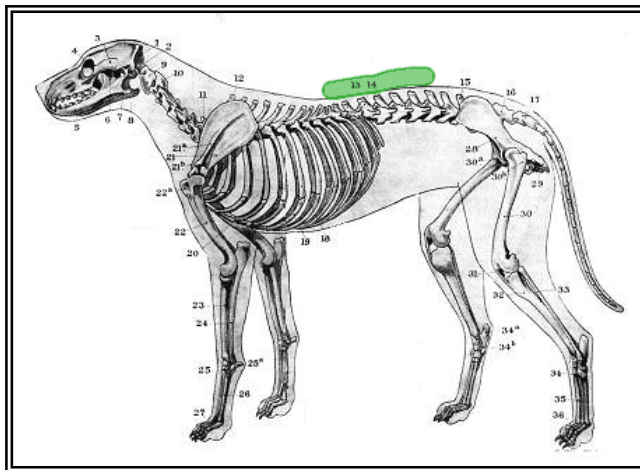
tion until the seizure ends. The exact area on the back is between the 10th thoracic (chest) and 4th lumbar (lower back) vertebrae (bones in the spine); what this means is that the top of the ice bag should rest just above the middle of your dog's back, following along the spine, and drape down to the lower-midsection of the back. See diagram.

Look for numbers 13 and 14 on the diagram. Number 13 on the diagram is the 13th thoracic (chest) vertebrae (there are 13 total); count back toward the head to number 10: that is your start point for the ice bag. Number 14 on the diagram is the 1st lumbar (lower back) vertebrae (there are 7 total); count toward the tail to number 4: that is your end point for the ice bag.

With a properly sized ice bag, you should not have to worry about being too exact: aim for the middle of the back, and the correct area will be covered. Application of ice to other areas of the body (head, neck, legs and other areas of the spine) was not found to be effective. Ice bags on the middle of the back was the only area found to work.

The article reports that the sooner the ice is applied, the better the results. So you should have an ice pack ready and prepared: if you have a

small dog, fill a small-sized (quart) ziplock freezer bag with cubed or crushed ice and keep it in a particular spot in your



freezer. When you hear or see a seizure begin, run for the ice or, if you live with another person, have one person run for the ice while the other runs to help the dog. Place the ice bag in the lower midsection of your dog's back and hold it there firmly until the seizure stops. If this technique works as reported, you should not have to wait as long as your dog's usual seizure and you may also see an improvement in the post-ictal period's duration.

The article reports that people who tried using a bag of frozen vegetables instead of ice had less success than those who used ice, so keep a bag of ice ready or a commercial ice pack used to keep soft drinks cold in a cooler. The article also indicated that dogs with cluster seizures are a special case and may need their usual protocols after the seizure, so if your dog is a clusterer, follow your veterinarian's instructions for using valium or write to our website for the rectal and oral valium protocol.

**Cedar Hirst**



## WHAT IS AN MRI SCAN?

*By Dr Clare Rusbridge PhD BVMS  
DipECVN MRCVS RCVS European  
Specialist in Veterinary Neurology*

Diagnosis of brain disease has always been difficult, but until comparatively recently, the neurologist was hampered by an inability to image the central nervous system i.e. there is no easy way to look inside that mysterious organ. The advent of MRI or Magnetic Resonance Imaging has revolutionised medicine, as it has provided a non-invasive way to look at parts of the body which could not be visualised by any other technique.

The standard method of looking inside the body is the radiograph or x-ray. Although excellent for viewing bone, radiographs do not provide good images of soft structures such as the brain. The EEG or electroencephalogram is the traditional method of evaluating the epileptic patient. The EEG measures the electrical activity of the brain and can indicate the site and presence of seizure focus. Although still a useful diagnostic test, the EEG does not provide as much information as an MRI scan and sometimes its results can be confusing.

The physics of MRI is very complicated. It works on the principle that the free water in our bodies, specifically the hydrogen ions, act like miniature bar magnets. These hydrogen ions become excited when put in a magnetic field and they emit energy. The scanner can measure this energy and can create a picture of the information. An MRI scan, therefore, is an image of how much water a structure contains and is excel-

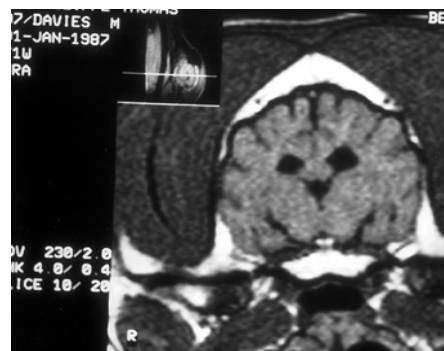
lent for viewing the brain as this is mostly water. In fact an MRI scan is so sensitive that the viewer can distinguish grey matter from white matter and normal structures from abnormal.

The images obtained from an MRI scan come as a series of "slices". Imagine that the brain is a loaf of sliced bread. A MRI scan allows you to look at each individual slice and see any irregularities. In Figure 1 we can see a MRI scan from Thomas Cliffe, our editor's dog. We are looking at slice number 10 out of 20.

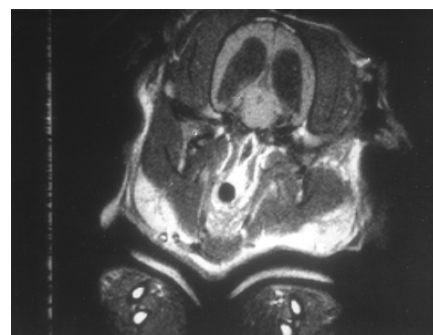
Each slice represents 4mm of tissue. Thomas has idiopathic epilepsy and as expected, his MRI brain scan is normal. The brain is the light grey, roughly circular structure in the centre of the picture. It is surrounded by a white shell, which is the bone marrow of the skull. The dark grey structures around the white shell are the large muscles which Thomas uses to bite and chew. The three black structures near the centre of Thomas's brain are the ventricles, which are fluid filled spaces within the brain substance. Compare Thomas's ventricles to those in Figure 2. This dog was presented for evaluation of seizures and aggression and has hydrocephalus or "water on the brain".

The ventricles are widely dilated and only a thin rim of brain tissue remains. This disease has occurred because a blockage has developed in the ventricular system. The dog in Figure 3, which was also presented for evaluation of seizures, has a brain tumour. This shows up as a bright white lump in the top part of the brain. The reason

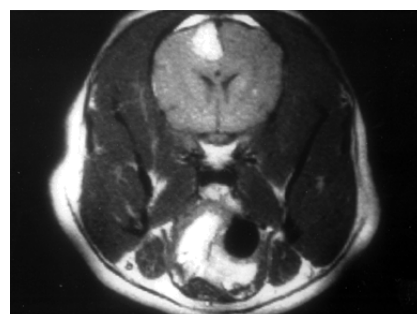
**Figure 1 – a normal brain**



**Figure 2 - hydrocephalus**



**Figure 3 – a brain tumour**



why the tumour is so obvious is because the dog was given a substance that is taken up by tumours but not by the surrounding normal brain. This substance contains iron and because of the magnetic properties of this element the abnormal area is highlighted.

The detail which can be appreciated by MRI has revolutionised the diagnosis of brain disease. The increased availability of this diagnostic imaging technique to veterinary surgeons means that more accurate diagnosis of animal brain disease is now possible.

## **WHAT IS AN EEG**

*By Dr Phyllis Croft (June 1997)*

EEG stands for Electro-Encephalo-Graph or Electro-Encephalo-Gram, the former being a machine and the latter being the record produced by the machine. EEGy and EEGer are also used for electroencephalography and for electro-encephalographer. EEGs have been widely used in human medicine for the past 50 years for diagnosing epilepsy and other brain conditions; they have been used in a much more limited way in veterinary medicine for some 40 years. The veterinary patients have usually been dogs because epilepsy is uncommon in other species, but EEGs can be recorded from most vertebrates.

An EEG differs from the various scans now in use in that it is a record of the activity of the brain rather than of its size or shape or position. It can be compared with the more familiar ECG which is a record of the activity of the heart. In some procedures the EEG can be used as an indicator of the level of consciousness of an animal; this can be helpful in surgery if relaxants are being used because these mask the normal reactions to pain.

### **PROCEDURE**

An EEG can be recorded from a conscious dog or from one that is sedated or anaesthetised; it just depends on the information required. The essential elements of a recording are -  
i). contacts with the skin on the top of the head, known as electrodes  
ii). a cable or flex connecting these with the machine and  
iii). the machine itself. 2, 4 or 6 electrodes are commonly

used so that the activity of different parts of the brain can be recorded and compared. These records are literally brain waves, the voltage of the activity of the brain being plotted against time. The electrodes obviously are not in direct contact with the brain and so the signal they receive is reduced by the resistance of the bone of the skull and by the skin and its associated grease.

Electrodes are designed so as to make good contact with the animal and satisfactory EEGs can be recorded from dogs and cats. Horses and other large animals often have sinuses overlying the brain and these make EEGs difficult. One of the problems with conscious dogs is ear movement; the muscles which enable dogs to prick their ears lie on the top of the skull; when these muscles are active they generate large electrical voltages and their waves may obliterate the smaller waves coming from the brain itself. For this reason, recordings are usually taken in a quiet room where there is no occasion for the patient to be alerted.

### **INTERPRETATION**

The equipment for EEGy is comparatively expensive and a room must be set aside for it and regular checks must be made to ensure that the machine is working reliably. Apart from this, the interpretation of the EEG is very difficult and only veterinary surgeons who have taken a course in EEGy and had a wide clinical experience in neurology can give reliable reports. Normal recordings vary considerably from breed to breed and with age in the first year of life. Because the record is taken from the surface of the

skull, it represents the summation of the activity of many different centres deep in the brain and so a detailed knowledge of brain structure is needed before interpretation can be attempted.

It follows from this, unfortunately that EEGy is today only available at a few centres in this country. An expert EEGer can detect primary epilepsy in the EEG of a dog that would appear normal in every other test (readers may remember Thomas Cliffe who had a normal MRI scan despite suffering from primary epilepsy - issue no 2 page 6). When fits are due to secondary epilepsy the EEG may give valuable clues as to the underlying cause (head injury, brain tumour etc.). This is quite reasonable because in primary epilepsy there is no abnormality of structure, such as a scar or swelling, the only abnormality lies in the activity and EEGy is the only procedure that measures activity directly.

Accurate differential diagnosis is one of the hallmarks of good veterinary practice and a dog presenting with fits can be a difficult problem. Specialist examinations are often recommended and in the end a diagnosis of primary epilepsy is made because the examinations have not shown any definite abnormality. It is important to know that a dog's fits are due to primary epilepsy because there is a hereditary factor in the causation. Heredity is not involved in secondary epilepsy.

Fits due to primary epilepsy do not usually occur until the dog or bitch is at least 1 year old so the breeder of the animal may be unaware of the situation unless the owner informs him or her. The fits usually occur



when the dog is relaxed or asleep, so it is quite possible for an animal with primary epilepsy to do well in the show ring. Many years ago a dog with this condition became Supreme Champion at Crufts. In those days the hereditary factor was little understood and widespread use of the Supreme Champion at stud has left a mark on the breed that is still apparent.

Expert EEGy is one of the important tools available to the veterinary surgeon working with companion animals. The information may be a vital factor in the well being of the individual patient and, in some cases, of the whole breed for many generations to come.

### **USEFUL TIPS FROM PCFCE MEMBERS**

Jean Collinson passed on the following tips

1) Mini Long-haired Dachs-hund Sami is tuned in to his 12 hourly pill doses with two alarm clocks - one set for am and one for pm. Whenever Sami hears the alarm play "You Are My Sunshine" he knows it's pill time and goes over to her. She slips his pills into marshmallows. They slip down easily adding minimal calories.

2) Use garlic as a natural flea repellent to keep house and dogs flea free.

3) Use a sharp kitchen knife, blade, or scalpel to split tablets. (From craft and hobby shops). Pill splitters can also work well too.

Lisa Comeau compiled the following from members of Epil-K9, an Internet discussion

group.

*"Nothing here is meant to be medical advice - these are only things that other people have done to make their dog's life and the human's life easier and safer. Not every idea will work for every dog, these are just suggestions. Bless you for caring so much about your dog."*

### **GIVING MEDICATION**

♦ Wrap the pill in a piece of cheese.

♦ Make small circles of bread with a cookie cutter, spread on peanut butter, stick the pill into the peanut butter and put another circle of bread on top. It helps to make up all the circles at once and store in a zip lock bag.

♦ Only one animal with a good appetite? Use an automatic cat feeder to dispense medication with dinner when you can't be home to give them.

♦ Make a "nanwich" of canned dog food and the pills.

♦ Many dogs on Phenobarbital gain weight, giving medication with food may make this worse.

♦ Keeping medication with you at all times may be important if your dog seizes frequently.

### **DURING THE SEIZURE**

♦ Some dogs are light and sound sensitive during seizure episodes. Try dimming the lights and keeping phones at a distance from the dog.

♦ Keep old towels or babies nappies handy to catch urine if your dog urinates during seizures.

♦ Some human epileptics say they have an easier time if the seizure is allowed to run its course. Calling the dog's name to bring it out of a seizure may not be the best thing for your dog. Try it each way and see which is more comfortable for your particular dog's seizure.

♦ Be prepared to transport a dog that cannot stand up and walk or is even in the middle of a seizure. Hard plastic children's sleds can be used to carry or drag the dog to the car. A heavy blanket folded can also act as a stretcher. If you are alone with a very heavy seizing dog, call the vet's office for instructions. Depending on where you live you may want to try calling the police for help in getting the dog into the car if no one else is available.

### **SAFETY**

♦ Seizure proofing your home is important since most of us cannot be there to watch our dogs at all times. Seizures may occur when the dog is home alone. Many people (in the USA) crate their dogs while they are not there. An airline type crate (e.g. Vari Kennel) minimises the chances of the feet getting caught up in the wires.

♦ When leaving the dog home alone, make sure the dog is not wearing a collar (especially with tags) that could get caught while the dog is thrashing. Choking can result.

♦ Some people make a special room for the epileptic dog, clearing out any objects/furniture that may injure a dog during a seizure. Crating or making a doggy room may be the best idea should you have a 'catapulting dog', that is

one that is projected or thrown across the room during seizures.

- ◆ Never leave an epileptic dog alone near any water deep enough to drown in.

- ◆ Protection or separation may need to be given in multiple dog households. A seizing dog can trigger the pack instinct in which an injured animal on the ground is attacked. Monitor your dogs until you know their reactions to the seizing dog.

- ◆ Baby gates can be invaluable to block off stairways or confine the dog to a certain room.

### **DR CROFTS OPINION ON CRATING**

Dr Croft's extensive experiences include being asked to provide information following a row about the crating of Army dogs in RAF aircraft. *"The Forces used to crate their police/guard dogs going on duty by plane to the Far East & Middle East. One of the Army's dogs had a fit and broke a leg - several others ditto but less serious injuries. Somebody suddenly realised that the RAF dogs had never had these casualties. Why not? Because the RAF flew its own dogs out loose - well, just on a lead beside the handler but the RAF reckoned the Army couldn't look after its dogs loose so they were crated after being given ACP\* (acetylpromazine), hence the fits etc. I suspect the RAF had to allow the Army to take their dogs on leads. This was, of course, some 30 years ago; hopefully things are better now. (\*ACP can precipitate fits in dogs suffering from primary epilepsy. ).*

### **PRE-MEDICATION AND EPILEPSY**

Dr Croft advised that ACP (acetylpromazine) when used as a

pre-medication prior to surgery (or as a tranquilliser for car sickness, grooming etc.) can precipitate fits in dogs suffering from primary epilepsy. She stated that there had been a number of reports of dogs developing status epilepticus and subsequently dying as a result of pre-medication with ACP.

Dr Croft said it was essential, therefore, that owners of dogs with primary epilepsy remember to inform their veterinary surgeon of the dog's condition if any form of surgery is being contemplated. If the dog is being treated away from home, for example as a result of a road accident, the treating vet could not be expected to know of the dog's condition.

Dr Croft went on to say that a vet who feels it is essential to use ACP must assess the attendant risks and if he proceeds, closely monitor the dog. If, however, routine surgery is being contemplated on a dog known to have primary epilepsy then it would be worth considering whether it is necessary to use pre-medication.

### **RESCUE REMEDY**

Several years ago, Marion Mitchell (Epil-K9) sent me a recommendation for Rescue Remedy. Marion used RR on her Dalmatian Emma *"with wonderful results"*.

*Rescue remedy, a homeopathic remedy (one of the Bach Flower Essences) has been found to be of enormous help to many seizing dogs. It has been known to prevent seizures, stop them once they have started and/or reduce the post ictal stage to just a few moments. Unfortunately, like many medications it doesn't work on all dogs.*

*Em's Holistic vet put me onto it*

*and many others on the list use it. I think it would be safe to say that over 50% of the list have it in the house. Some of us have a bottle upstairs and one downstairs.*

When using it on her dog, Marion would wait until the seizures have subsided and then put the drops into the side of the dog's mouth. In those dogs where the mouth is wide open for sometime, it is worth trying to get drops into the mouth from a distance, making sure the glass dropper is well out of harm's way.

Marion mentioned applying it to an acupuncture point on the head (between the middle of the ears) but feels it is better placed directly into the mouth. RR can be obtained from leading chemists or your local pharmacy.

### **JEAN COLLINSON WRITES ABOUT: EPITAUR®**

Jean's Dacshie, Shani, has been taking Epitaur for quite some time as it contains a number of supplements.

**Epitaur®** Epitaur Ref: 4972M

Epitaur 500 - Nutritional supplementation for animals with epilepsy. Epitaur 90, 180 or 270 capsules

Epitaur 500 - Nutritional supplementation is important for animals with epilepsy and Epitaur 500 is specifically formulated to contain ingredients thought to be able to help in cases of epilepsy.

**Taurine:** High concentrations of Taurine are found in the nervous system. It is an amino acid and a building block for others. It has a protective effect on the brain especially when dehydrated. We suggest all animals who suffer from fits should have



a diet high in Taurine.

**Tyrosine:** This amino acid is the building block for neurotransmitters such as dopamine and adrenaline and is an antioxidant.

**Zinc:** Zinc deficiency can lead to destruction of nerve cells, it is essential for vision and cell growth.

**Magnesium:** It is found in high concentrations in the brain, deficiency giving rise to mental confusion and problems with nerve conduction. It is critical to the functioning of many enzyme pathways and cellular functions.

**B complex vitamins:** These vitamins help to maintain the health and proper functioning of the brain and other nerves. Deficiency can result in convulsions among many other symptoms.

**Directions:**

1 capsule twice daily - up to 12kg

3 daily - from 12 to 24kg

4 daily - between 25 and 40kg.

### **JEAN COLLINSON WRITES ABOUT FLEAS**

Jean Collinson has a comprehensive list of natural flea treatments and tips. She tries not to use chemical flea or tick treatments on her dogs, regularly using brewer's yeast tablets and garlic to keep fleas away.

❖ You could put home-made sachets of dried lavender seed under the cushion in the dog's bed or mint leaves.

❖ For day to day protection, mix up a cider vinegar solution of 1 part vinegar to 2 parts water, keep it in a spray bottle and spray the dog's coat daily.

❖ Boil a good handful of elder leaves in water, cool, strain, and put in a spray bottle.

❖ To discourage fleas from living in your carpets, sprinkle with any common household salt. Leave for about 10 minutes then vacuum it up.

❖ An effective flea shampoo can be made from a cheap supermarket brand of dog shampoo mixed with a few drops of pennyroyal or eucalyptus oil.

❖ Brewer's yeast rubbed straight into the dog's coat, massaged and left also helps against fleas. Alternatively you can rub the citrus oil from orange peel onto your dog's coat or use lavender essential oil.

❖ Flea trap: get a night light or bedside light with a low wattage bulb and plug it in on the floor in a corner of the room you want to treat. Under the light place a container of water about 4" deep with 3" of water in it. Fleas are attracted by the warmth and will drown themselves.

❖ If you are still getting bothered by fleas in the home, buy an old fashioned fly paper, cut into strips and place in the corners of the room. Good for trapping fleas and safe.

❖ Herbs to sprinkle around the room are pennyroyal, tansy and fleabane, fresh or dried, sprinkled around the edges of your rooms and in your dog's bedding. Vacuum them up after a few hours. The herbs in the dog's bedding will remain effective for about a month but my dogs' bedding gets washed before that!

❖ Homemade flea collar: Soak a large handkerchief (ok for small dogs but you might need a scarf for larger ones) in the following mixture over night:

one drop each of oil of lavender, cedarwood, thyme and fennel, half a teaspoon of alcohol (vodka is good) all mixed with the contents of 4 garlic capsules and one drop of garlic essential oil (if you can find it). Dry and tie around your dog's neck with a knot that won't slip. This scarf will repel fleas for about 2 months. No need to throw the scarf away – just repeat the process. If all these ingredients put you off, soaking the scarf in just lavender oil will work as well.

**Shani Collinson**



**James & Bliss Scott**



### Notes

<sup>1</sup> From *"Don't Panic About Fits"* by Stewart Jennings BA, VetMB, MRCVS (May 1997)

<sup>2</sup> & <sup>3</sup> *"Epilepsy in the Dog"* a client handout by veterinary surgeons Fields & Wheeler of Cornwall

<sup>4</sup> From *"Don't Panic About Fits"* by Stewart Jennings BA, VetMB, MRCVS (May 1997)

## **DR CROFT REPLIED:**

◆ *How important is it to administer medication regularly? If a 12 hourly medication is prescribed and the first dose is given at 8am must the second dose be at 8pm exactly?*

**DR CROFT:** If medication is given twice a day, half an hour late or early will not matter. The important thing is that the dose is not forgotten altogether. If medication is given more often, say three times a day, the margin of error is less and the dose should not be more than 10 minutes late or early.

◆ *Is there a danger of brain damage from fitting?*

**DR CROFT:** Fits due to primary epilepsy seldom cause permanent brain damage. Many owners can recall dogs that had fits for up to 10 years and eventually died from something else. Prolonged status epilepticus, however, can produce brain damage.

◆ *Is it possible for antibiotics to cause fitting?*

**DR CROFT:** Antibiotics are not known to cause convulsions BUT if a dog has an infection, the infection could spread and affect the brain and cause a fit. The damage to the brain might not be apparent until the more obvious infection has disappeared.

◆ *If fits are occurring at intervals of 8 weeks and are not severe, is it necessary to medicate?*

**DR CROFT:** This must ultimately be the decision of the veterinary surgeon but it is not usual to give any treatment until the dog has had several fits in a

month. Medication often has unwanted side effects, so it is not wise to start treatment until it is really necessary.

◆ *Is it wise to give an extra tablet of phenobarbitone to your dog if you feel it is about to have a fit?*

**DR CROFT:** It is not wise to do this unless your vet has advised you to do so because phenobarbitone is a dangerous drug and could do harm and also it will upset tests.

◆ *It was suggested that a product called "Nutri Drops" might be useful in the treatment of seizures due to hypoglycaemia.*

**DR CROFT:** Hypoglycaemia is rare in dogs and is usually associated with over activity of the pancreas (e.g. a tumour) and hence too much insulin. Signs are usually initially, retching and vomiting, then fast heart and eventually coma but are not common. We don't know what is in the Nutri Drops but I doubt if they would help dogs with primary epilepsy.

◆ *What should one do if a dog is on a high dose of phenobarbitone for its weight?*

**DR CROFT:** The dose of phenobarbitone stated is very high and will produce untoward side effects soon. If seizures are not controlled it looks as though some other anticonvulsant should be tried, or another form of phenobarbitone (Epiphen) and some estimation of blood serum level done as maybe it is not being absorbed.

◆ *Many members are concerned about flea control especially as some proprietary products such as Frontline appear to induce fits in susceptible dogs.*

**DR CROFT:** I suspect that this is a difficult area in which to prove anything. I think it is reasonable to advise the owner of an epileptic dog not to use a flea collar. I would first try to get the fleas away on a comb and then put the comb in something to kill them. BUT, 18 months ago, when my own dog Lottie had such an infestation that I just wasn't winning with a comb, I used Frontline - just once - and the whole trouble was over. Fleas lead to tape worms and to misery from scratching, never mind the allergy problem.

◆ *What are the possible causes if more than one of the pups in a litter develops epilepsy?*

**DR CROFT:** Several pups in a litter can obviously be due to genes but on the other hand, it may not be primary epilepsy. For instance, the dam may have jumped a fence and got stuck on the top rail and affected the position of everything in the uterus by the time she struggled free. It depends on the age of onset of fits I think. If before 6 months, it is not really likely to be PE.

◆ *What could be the reason for excessive thirst in a dog medicated with potassium bromide?*

**DR CROFT:** I would have suspected kidney trouble, but your vet can confirm this. Two other thoughts:

1) Potassium bromide sometimes makes a dog thirsty.  
2) Dogs get diabetes just like humans and thirst is usually the first sign. Your vet can test urine for that. He/she could give you a bottle and you could get some urine and Sherry need not go to the surgery. Perhaps this has already been done but if not, it would be wise to do it.