

# **Symmetrical Lupoid Onychodystrophy (SLO) by Jo Tucker**

**(Information Taken from SCBCC Seminar Notes 2011)**

## **DISEASE PROCESS:**

Auto-antibodies infiltrate and damage the nailbed skin and surrounding area causing the nails to fall off or grow deformed. This is called Symmetrical Lupoid onychodystrophy, otherwise known as SLO.

The term 'autoimmune' is used when the immune system begins destroying good cells for no apparent reason i.e. there are no underlying causes such as infectious or chronic inflammatory disease, or tumours.

## **NUMEROUS AUTOIMMUNE DISEASES**

There are many different types of autoimmune disease affecting different parts of the body. A dog can develop an autoimmune disease that affects one part of the body only, or that affects several parts simultaneously. This presentation is about primary SLO - an autoimmune disease that affects the nails only.

A short overview of why and how an autoimmune disease develops is necessary to give a better understanding of the SLO disease process.

## **What You Should Know About Autoimmune Disease in the Dog**

### **GENETICS**

It is known that autoimmune disease in the dog occurs in animals that are genetically predisposed. This means that they have an inherited risk of developing autoimmune disease. It is thought to be a complicated mode of inheritance involving more than one gene; this is known as polygenic. Both parents carry the genes responsible and it does run in families, but this does not necessarily mean that if one dog in a litter gets an autoimmune disease the others will also follow. This is possibly due to the different mix of inherited genes in individual pups in a litter, or environmental factors. Unfortunately, at the moment, there are no DNA tests for these diseases.

### **AGE**

It is more likely to occur in a young to middle aged dog, but occasionally dogs as old as 14, or more, have been known to develop an autoimmune disease.

## **GENDER**

Females seem to be more prone - and this probably due to hormonal influences. Also, it is known that hormones can be a major trigger factor for autoimmune disease in the dog, as in humans.

SLO is known to affect: GSD's, Rottweilers, Standard Schnauzers, Bearded Collies, Greyhounds, and many other breeds. Cross breeds can also be affected.

So, for a dog to develop an autoimmune disease it needs to have a genetic predisposition, but that's not all, as it would have to encounter a 'trigger' that causes the immune system to malfunction.

## **SO WHAT ARE TRIGGER FACTORS?**

Anything within your dog's environment that may challenge the immune system can be a potential 'trigger'. A dog that develops an autoimmune disease may have encountered the same trigger factor before, with no detrimental effect, but for some reason 'on this occasion' it has caused the immune system to malfunction resulting in the dog developing an autoimmune disease.

### **Possible trigger factors are:**

1. Stress eg., fireworks, thunderstorms, separation anxiety, whelping, hormones etc.
2. Viral or bacterial infection.
3. Reaction to chemicals, drugs or vaccines (vaccination has been proposed as a possible link to SLO).

When a dog has SLO, the damage to the nail occurs at the site of the nail bed, deep beneath the skin. As nails are slow growing, it is likely that the trigger occurred a few months before clinical signs appeared.

### **Nail Growth:**

Normal nail growth is: 1.9mm per week. This is approximately 2.5cm (1 inch) in 13 weeks.

## **The Importance of a Good Immune System**

The immune system is very complex. It is designed to protect the body by identifying, and then destroying, foreign invaders such as bacteria or viruses. In order to do this the immune system develops a 'memory', probably before birth, to distinguish between what is:

'itself' - the good cells - its own body

and

'non-self' - the bad cells - foreign to its body

A dog with an autoimmune disease **does not** have a weakened immune system, on the contrary it works extremely well - but what it does have, when triggered, is a confused one. Unfortunately we cannot see our genes - and maybe in some cases that's fortunate! A 'genetically predisposed' dog looks like any other dog until an autoimmune disease develops.

It is not known why dogs with a genetic predisposition develop a specific autoimmune disease or indeed develop more than one autoimmune disease. It may be due to the combination of inherited genes (or lack of them); different environmental influences; or a particular set of untimely circumstances that triggers specific diseases in a predisposed dog.

For as long as I have been involved with beardies, nail problems has been a concern of owners and breeders. This problem was always referred to as a 'nail bed infection'. It was not until 1997, when an article was published in the Beardie Times (which suggested that this well known, relatively common problem might be an autoimmune disease) that beardie owners started to worry that this might have a genetic link. A Finnish study of SLO in Bearded Collies, published earlier this year, has shown that SLO is not caused by an infection but it is an immune mediated disease.

*"SLO is an immune-mediated hereditary disease which affects claws. This disease was earlier almost unknown but during the past few years more than 20 Finnish Bearded Collies have been diagnosed with SLO. (The yearly registrations of Bearded Collies in Finland in the last five years have been between 58 to 107 dogs.) Based on the pedigrees of these dogs it seems that SLO is caused by only one or few recessive autosomal genes. This means that the defective gene(s) has to be inherited from both parents. A dog which inherits the defective gene only from one parent is healthy but carries the disease. This explains the sudden clustering of SLO. The hidden nature of the gene has enabled its spreading in the breed".*

### **To sum up:**

A primary autoimmune disease may occur if a genetically predisposed dog encounters a trigger factor that causes the immune system to become confused and mounts an attack on its own body parts or systems.

### **How do you control the immune system and get it to behave normally again?**

Drugs are used to significantly suppress the immune system in order to stop the destruction and allow the body to heal and work normally again. When clinical improvement is seen, the drugs are reduced over a period of time, slowly releasing the immune system back to normal function and, hopefully, achieving a state of remission. There is no cure for autoimmune disease but long term remission can be achieved. Dogs may have an autoimmune disease only once and never get it again but there is always a possibility that a

predisposed dog could relapse or get another autoimmune disease at a later date. Some dogs will stay in remission without any drugs and others will have to be controlled on a low every other day maintenance dose.

### **SLO comes under the heading of an autoimmune skin disease.**

#### **Definition:**

**Symmetrical:** Affecting corresponding parts simultaneously and similarly.

**Lupoid:** Comes from the word lupus meaning any of a group of skin diseases in which the lesions are characteristically eroded.

**Onychodystrophy:** Abnormal claw formation.

As previously stated, SLO can be 'primary' or 'secondary', meaning it can occur in isolation, i.e. primary, or it can be secondary to another autoimmune disease such as, pemphigus skin disease; or SLE, a multi-systemic autoimmune disease which is far more serious.

Unlike some autoimmune diseases primary SLO is not life threatening, but it is a very painful and miserable condition until correct treatment is well under way. Primary SLO involves the nails and surrounding area of the feet only. Multiple nails on different feet are always affected but this can take many months to fully develop. Routine blood results are normal in a dog with primary SLO. A dog with secondary SLO would show other signs of being unwell eg., footpads can be affected and other areas of skin involved, very high temperature, lameness, anaemia etc.....

#### **Differential Diagnoses**

In addition to SLO being linked to other autoimmune diseases, nail disorders can be caused by:

- Trauma (very unlikely that all claws would be involved)
- Infection – bacterial, fungal (again, very unlikely that all claws would be involved)
- Endocrine problems: (eg., resulting from an underactive thyroid or Cushing's syndrome)
- Nutritional causes

If the reason for sloughing nails were due to any of the above, other than trauma or infection, it is likely that other clinical signs would be evident.

#### **Wrong Diagnosis**

Initially only one or two nails are affected. It's common, and not unreasonable, for the vet to assume a diagnosis of bacterial or fungal infection and treat accordingly. Treatment can go on for several months before both the vet and owner accept that the treatment is not

working. The longer SLO is left without appropriate treatment the more nails will become affected. Secondary infection is very likely because the feet are in contact with the ground and the dog will naturally lick his sore feet which may also cause infection.

The first thing you may notice if your dog has a nail problem is when he cries out in pain and limps, or licks his foot. Nails can bleed profusely and this can be alarming to start with. It is natural to think that he has caught his nail on something that perhaps has broken it and made it bleed. It is probably not until a second and maybe a third nail becomes a problem that you might start to connect the two and wonder if this is more than just accidental damage of a couple of broken nails. Of course, one lost nail may be due to trauma or even an infection but if the problem extends to other nails on different feet then it could be SLO.

### **Clinical signs of SLO can include:**

- Lameness, swollen toes.
- Loss or partial loss of nails, licking of feet.
- Bleeding and/or discharge from the nail or surrounding skin.
- Deformity caused by abnormal growth.
- Secondary infection.
- The dog is generally well but may be depressed due to pain.

The disease is progressive and it can take months before all claws are affected. Blood tests will be unremarkable but a full blood test is essential to first rule out the possibility of an underlying disease.

### **Diagnosis**

Regardless of overwhelming clinical signs, an absolute diagnosis of SLO can only be confirmed by the amputation of the first digit of a preferably, non weight bearing toe (the third phalanx) or an affected dew claw. This enables the pathologist to identify infiltrating immune cells (principally from the coronary band at the top of the nail) which confirms the diagnosis.

Removal of an affected dew claw is preferable as it minimises post surgical complications and trauma. A punch biopsy is not to be recommended as it is difficult to perform and rarely gives conclusive results. Broken or deformed sloughed nails are of no diagnostic value at all.

## Presumptive Diagnosis

A confirmed diagnosis of SLO is valuable information for the vet, owner and the breed, but if the painful amputation of the end of a toe, or a dew claw, is not something you want to put your dog through, and you would rather consider the overwhelming clinical signs and start treatment for SLO, then the following observations are important to recognise:

- Loss of nails on multiple digits, without evidence of systemic disease, is distinctively characteristic of SLO and a presumptive diagnosis can be made and correct treatment started.
- SLO is progressive. Initially, only one or two nails affected. Further nails involved and worsening of clinical signs despite prolonged antibiotic therapy.
- SLO is the most common cause of symmetrical nail disease in dogs.
- Family history, age of dog and known breed predisposition.
- Improvement after correct treatment has started.

## Treatment Options for Autoimmune Skin Disease

Fortunately, there are different treatment options for autoimmune skin diseases and as primary SLO is not life threatening, the most popular treatment seems to be a combination of Tetracycline or Doxycycline with Niacinamide (Vitamin B3).

Tetracycline and Doxycycline are antibiotics which also have anti-inflammatory effects and suppress antibody production. It is an immunomodulating drug, meaning that it has the ability to adjust the immune response to a desired level.

Note: Tetracycline (and Oxytetracycline) should be used with caution in dogs with renal impairment as it is eliminated from the body via the glomerula filtration and a build up of the drug can occur if used for prolonged periods. If it is necessary to give a dog with renal impairment Tetracycline or Oxytetracycline the dose should be lower than recommended but a lower dose may not address the problem of SLO, and also the treatment is likely to be for many months at least. However, Doxycycline is excreted in the faeces and does not affect renal function and can be used in animals with renal insufficiency. (***Plumb's Veterinary Drug Handbook***)

Tetracycline or Doxycycline is commonly used in combination with Niacinamide (vitamin B3) for the treatment of immune mediated skin diseases. Niacinamide works with Tetracycline or Doxycycline to further suppress antibody production.

**Important:** *Niacinamide is also known as nicotinamide but it **must not** be confused with, Nicotinic Acid, (Niacin). Although Niacin acts identically as a vitamin, it increases the blood flow and blood pressure, and should not be used.*

It will take 1-3 months before any positive results are seen (although duration of treatment is much longer) but, in spite of this, it seems to be the treatment of choice for SLO as it is usually well tolerated and it avoids the use of steroids and other stronger drugs. Many dogs do very well on this treatment regime. When good clinical improvement is seen the drugs can be gradually reduced and the dogs weaned off medication over a period of months.

**Dose: Tetracycline & Niacinamide**

*Dogs less than 10kg : 250mg each Tetracycline and niacinamide every 8 hours*

*Dogs more than 10kg : 500mg each Tetracycline and niacinamide every 8 hours*

*Note: Food can significantly reduce (up to 50% or more) the amount of Tetracycline or Oxytetracycline absorbed. Avoid giving oral tetracycline within 1-2 hours of feeding or giving milk or dairy products*

*Doxycycline (5mg/kg/24 hrs) can be prescribed instead of Tetracycline and may be more convenient as it is given only once a day and, unlike tetracycline, food and dairy products do not affect its absorption.*

*(Plumb's Veterinary Drug Handbook)*

**Note:**

Some authors recommend eg., **Michael J Day – Clinical Immunology of the Dog and Cat**

*Dogs less than 10kg : 250mg each Tetracycline and niacinamide every 12 hours*

*Dogs more than 10kg : 500mg each Tetracycline and niacinamide every 12 hours*

**Steroids**

Steroids are life saving and can work like a miracle drug at times but, obviously unless you have no choice as in a life threatening situation, it is always worth trying other treatment options before using high doses of steroids and other more potent and expensive drugs. If you and your vet choose steroids to treat your dog's SLO you may see quicker results, because the effect of steroids on the immune system is rapid. However, the usual side effects of steroids can be expected.

Steroids suppress the immune system in order to stop the destruction. The dose of steroids has to be 'immunosuppressive', anything less and the treatment will not work and remission will not be achieved. Over a period of months the dose is gradually reduced.

**Immunosuppressive doses of steroids:**

*Prednisolone 1-2mg/kg/12hrs – starting at the lowest dose and gradually reducing dose over a period of months.*

*(Clinical Immunology of the Dog and Cat by Michael J Day).*

**Note:** Steroids can cause an excess of stomach acid so, as a precaution, giving something to protect the stomach, such as Antepsin and/or Ranitidine alongside steroid treatment, is prudent. Dogs treated with steroids without a gastroprotectant may develop stomach ulcers and all the problems associated with this avoidable complication.

The side effects of steroids should be considered when deciding on a treatment for SLO. I am not going to expand on what to expect when your dog is on immunosuppressive doses of steroids, or the side effects of using steroids, but if you do decide to go down the steroid route and would like to have more information or clarification, please contact me.

Regardless of which treatment you opt for, the damage already done to the nails within the nail bed will have to be dealt with in the usual way, and as the damaged nails emerge through the skin they may have to be surgically removed. Sometimes, if the nails are only deformed, and not split or fractured, they can be managed by keeping them short. Hopefully within a few months the new nails will emerge looking much healthier or at least, not broken or fractured, and the dog will be free of pain.

Other drug options, if your initial choice doesn't work, can include:

(Chlorambocil, Gold salts, Pentoxifiline, Retinoids, Azathioprine, Atopica)

- **Pain Relief** especially in the early stages or after surgery may be necessary, eg. Tramadol.
- **Essential Fatty Acids (EFA's)** are given in therapeutic doses, regardless of which primary treatment regime is used. High doses of EFA's also play an 'active' role in the treatment of skin diseases and should be included in the treatment regime and in low maintenance doses after remission. EFA's are known to be 'steroid sparing' in high doses. This means that they may ultimately, lead to a lower dose of steroids being used and this is especially useful in dogs that have to remain on steroids.

### **EFA Ratio**

**Quote:** "Research is being performed to determine the optimal ratio of omega-6 to omega-3 fatty acids that should be consumed. Previously, it was thought that the ratio should be approximately 15:1. Current recommendations are for ratios of 10:1 to 5:1." (*Omega fatty Acids: sources, Effects, and Therapeutic uses in Dogs, Veterinary Services Department, Drs Foster & Smith, Inc. Holly Nash, DVM, MS*)

### **Example Therapeutic Dose: Essential Fatty Acids**

**Quote:** "Effect appears to be dose related and optimum doses and the most effective combinations of these oils have not yet been determined. Daily doses of:

- *Evening Primrose oil 172mg/kg/day*
- *Fish oil @ 44mg/kg/day*

have been used in dogs over a one year period without ill effects.”

*(Ref: The Veterinary Formulary by Yolande M Bishop)*

- EFA dose should start at a high level until a response is seen. This can take up to 12 weeks. EFA's can cause loose stools. If this occurs, start on a lower dose and build up to highest dose over a couple of weeks. Avoid Evening Primrose Oil in dogs with epilepsy. Branded veterinary products are available. Follow manufacturer's dosing recommendations.
- **Natural Vitamin E (400-800iu/12hrs)** encourages new cell growth.

*(Ref: Clinical Immunology of the Dog and Cat by Michael J Day).*

- **Chinese herbs** are also noted as being effective but the owner would have to go to a vet who practices in natural treatments.
- **Biotin (\*5mg/kg/day)** improves the quality of the nails but it can be difficult to obtain. Some dogs with SLO have shown to be deficient in biotin. This may be due to their diet. Foods with a relatively, high biotin content include cooked eggs, liver, chicken livers, kidneys, some vegetables eg., boiled broad beans, raw or canned tomatoes, raw cauliflower, dried skimmed or whole milk, fresh milk, bran, yeast and raw egg yolk. **Do not give raw egg white** as it contains a substance called avidin which binds to biotin and prevents its absorption. This does not apply to cooked egg whites as the cooking process deactivates avidin.
- **Gelatine** – *\*10 grains (one capsule) every 12 hours. (\*Ref: Muller, Kirks Small Animal Dermatology).* Some owners give 1-2 cubes of jelly every day.
- **Good quality high protein diet** in case of deficiencies.
- **Antibiotics** if secondary infection is present
- **Topical acrylic nail cement** applied externally to permanent nail deformities, which suffer from re infection, could be strengthened and protected by this application.

I haven't known a dog to have external acrylic nail cement treatment but reference to this can be found in *Muller, Kirks Small Animal Dermatology*.

- **Removal of loose nails** Loose nails may have to be removed, usually under anaesthesia. As you can imagine, recovery from this procedure is likely to be very

painful. Clipping, cleansing, removal of the fractured portion of claws may be necessary even after treatment is well under way.

- **Topical shampoos, Antiseptic soaks** (Salt or Epsom Salt foot baths, Hibiscrub etc). Initially it may be necessary to bathe your dog's feet to keep them clean and to wash off the blood etc., but once they are dry and healing it seems better practice to try to keep their feet dry. Antiseptic soaks or salt soaks will help to soothe and clean. Epsom salt soaks are supposed to be very soothing when the dog has pain. When the feet are sore and weeping, you can use socks and boots (or strong plastic bags tied with string) when out walking. This will keep the feet clean, but do remove the boots when indoors otherwise the feet may become warm and sweaty which could set up more secondary infection and prolong the healing time. New nails should be kept short.

## **Recovery**

### **Tetracycline or Doxycycline/Niacinamide**

Recovery is slow especially if the treatment is Tetracycline or Doxycycline and Niacinamide. It takes at least 6 weeks before real improvement is seen. Although some owners have said that they have seen positive results within 4 weeks. Dogs appear to tolerate this treatment very well, without any obvious side effects. However, if adverse effects become a problem reduce the Niacinamide first, as this is more likely to cause an adverse reaction than the Doxycycline or Tetracycline. (*Plumb's Veterinary Drug Handbook*).

### **Steroids**

Steroids are very powerful drugs. The immune destruction is halted and inflammation reduced within days of starting treatment, but steroids cannot reduce the damage already done. Nails will slough off in the usual manner.

Generally, a dog with any autoimmune disease benefits from being treated promptly and correctly as clinical signs will get worse the longer treatment is delayed.

### **A more favourable outcome can be achieved if:**

- Diagnosed quickly
- Treated correctly
- The best choice of drugs used
- Appropriate dose for the disease
- Given for the correct duration of time
- Correct protocol for weaning down drugs - minimises side effects and optimises success of the drug regime. – very important when using prolonged, high doses of steroids

## Relapses

Relapses are not uncommon. If the dog is in remission when a relapse occurs, then it is most likely that he has encountered another trigger factor. Treatment must start again at the original dose.

If a relapse occurs whilst still on treatment, then it is possible that the dose of the drug had been lowered too quickly or the initial dose was not high enough to achieve remission. The treatment regime must be reviewed, or changed. Consider the possibility of an unidentified, underlying cause.

## Autoimmune Disease - Working with your vet

It must always be a consideration that some vets in general practice may not have the experience to recognise autoimmune diseases, or even know the correct treatment. Autoimmune disease can mimic other more common conditions such as: infection, organ failure and even cancer. It is unreasonable to expect vets in general practice to know all of the diseases different breeds are predisposed to. It should be the owner's responsibility to be aware of the potential health problems within their dog's breed. Don't forget that you and your vet are your dog's best friends and if your dog is showing signs of illness, obviously the vet is the first place to go. Working together with your vet is essential and your 'breed specific' knowledge may assist the vet in reaching a correct diagnosis with the minimum of delay, and that may just make the difference! If your dog is not improving and you don't feel happy with the way your vet is dealing with the problem – consult another vet or ask your vet for a referral to a specialist.

## Life after a diagnosis of SLO

Yes, a good life can be expected. You just have to be aware of clinical signs so if a relapse occurs, prompt treatment will give the best results. Your aim is to achieve long term remission. I recently had an update from an owner whose dog was diagnosed with SLO six months ago. Treatment with Doxycycline and niacinamide, and EFA's, has been successful and the dog is back to normal again.

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## References

*Plumb's Veterinary Drug Handbook. Clinical Immunology of the Dog and Cat by Michael J Day*

*The Veterinary Formulary by Yolande M Bishop.*

*Muller, Kirks Small Animal Dermatology, UK Vet Publications.*

**CIMDA**: <http://www.cimda.co.uk/>

**SLOdogs support**: <http://pets.groups.yahoo.com/group/SLOdogs>

**Link to Finnish SLO Study Document:** [http://www.beaconforhealth.org/DLA\\_raporttiEnglish.pdf](http://www.beaconforhealth.org/DLA_raporttiEnglish.pdf)

**For SLO survey and current research:** **BeacCon for health:** <http://www.beaconforhealth.org>

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