

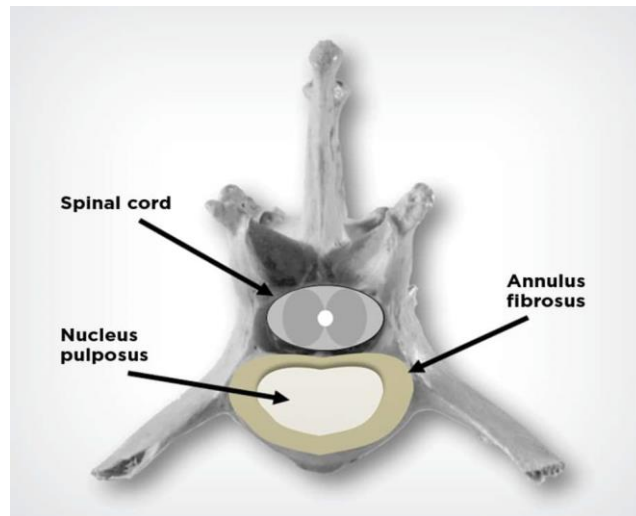


Canine Intervertebral Disc Disease: What is it and how much do we know?

- Recovery of ambulation in medically-managed non-ambulatory small-breed dogs with thoracolumbar intervertebral disc herniation

What is a disc?

- The spine is made up of individual bones called vertebra and between each of these is an intervertebral disc designed to be a shock absorber
- This has two parts
 - An outer tough, fibrous part that gives it strength
 - An inner gel like part that gives it the shock absorbing capacity



What happens when it goes wrong?

- As dogs get older the disc starts to degenerate
- This means that the inner gel like component starts to harden and become calcified
- This means it is not as good a shock absorber and more prone to problems

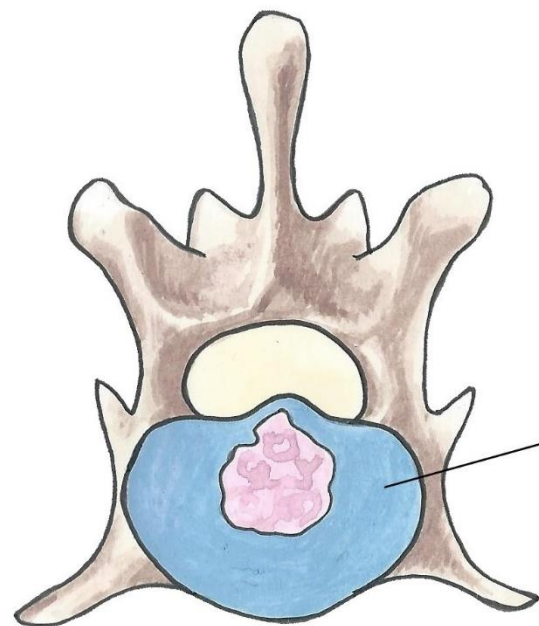


Terminology

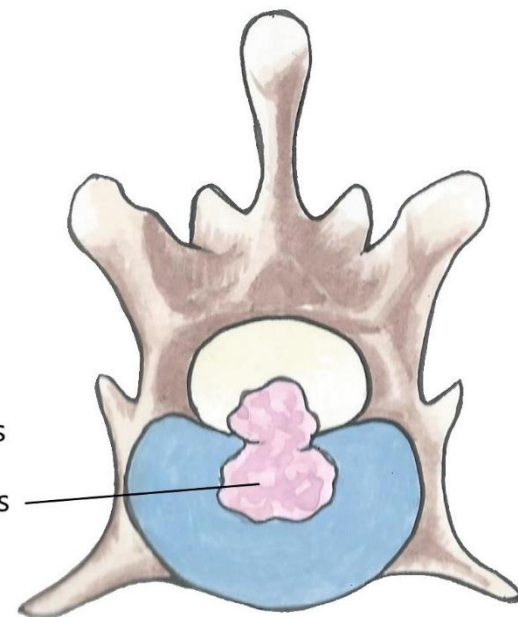
- **Intervertebral Disc Disease (IVDD)** refers to the overall process of disc degeneration and problems associated with the degeneration
- **Intervertebral Disc Herniation (IVDH)** is a term that includes all conditions where part of the intervertebral disc enters the spinal canal or impinges on the spinal cord – there are many different types of intervertebral disc herniation
- **Intervertebral Disc Extrusion** is when the inner nucleus pulposus is squeezed out, colliding with and pressing upon the spinal cord (like a jam doughnut or toothpaste tube)
- **Conservative/ medical management** are interchangeable terms for any treatment regime that does not involve surgery – this almost always consists of pain relief, cage rest and physiotherapy



protrusion



extrusion



annulus fibrosus

nucleus pulposus



Intervertebral Disc Extrusion

- This is where the now hardened and abnormal inner component of the disc ‘explodes’ out and collides with the spinal cord
- This causes two types of trauma to the spinal cord
 - Contusion (bruising)
 - Compression
- Each individual disc extrusion is a unique combination of these



Who gets them and what does it look like?

Who?

- The most affected are chondrodystrophic dogs such as dachshunds, cocker spaniels, corgis and basset hounds
- The median age is 5yrs but can occur from 1yr of age
- In the miniature dachshund thoracolumbar intervertebral disc herniation is known to have a lifetime prevalence of ~20% and is fatal in 25% of cases (Bergknut et al 2012) – **so 5% of all miniature dachshunds will die of IVDH!**

What does it look like?

- Signs usually start very suddenly and initially progress and range from back pain alone to complete paralysis and loss of feeling



What next?



Management

- It seems logical that when there is a compressive problem, we should remove the compression.....
- In fact surgical decompression was first introduced over 50 years ago and it has been very successful
- There is a general perception that more severely affected patients require surgery
- Given the success of surgical management it is very difficult for vets to recommend non-surgical management
- However, we know that many severely affected dogs will improve with non-surgical management and there have been no formal clinical trials comparing surgical and non-surgical management
- There are currently no robust criteria to distinguish patients that unequivocally require surgery from those which will recover whilst receiving non-surgical medical management



What are we doing at Cambridge?

- We are looking for dogs who have become suddenly unable to walk on their back legs, are suspected to have intervertebral disc extrusions and who cannot afford surgery
- They will have a consultation, neurological examination and MRI (under sedation) to confirm the diagnosis of a disc extrusion
- We will then assist with 12 weeks medical management (rest, pain relief, etc.)
- After 12 weeks they will return and have another consultation, neurological examination and MRI
- We aim to:
 - Determine what proportion of dogs will get better without surgery**
 - Determine if there anything that can help us predict which dogs need surgery and which do not**



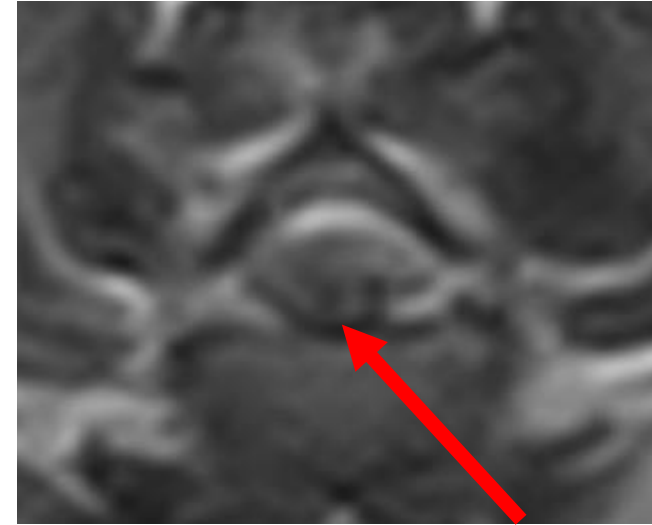
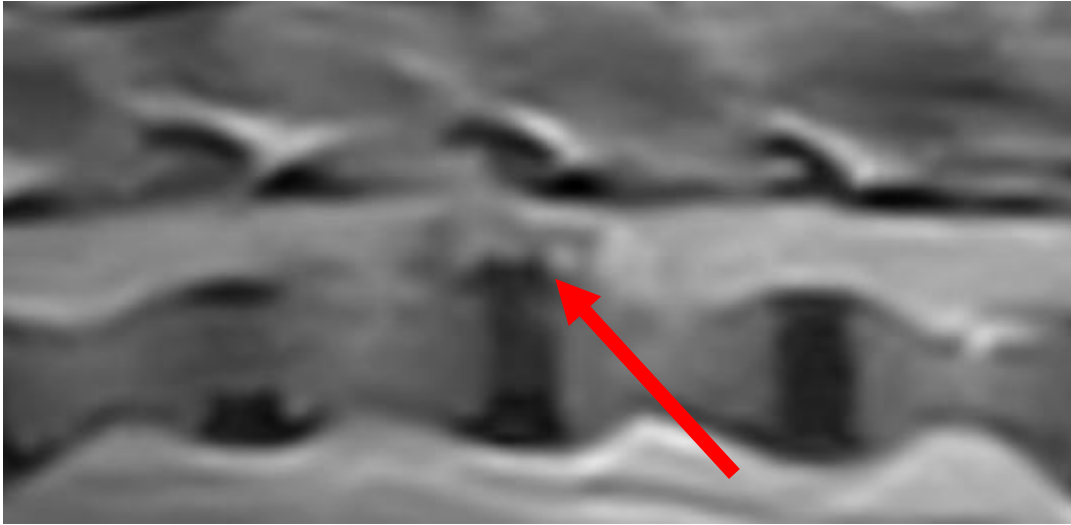
Our first case

- 4y 10m FN Mini Dachshund
- Had a previous surgery for an intervertebral disc extrusion 4 months before coming to the QVSH and had fully recovered
- She started to have back pain and despite pain relief and rest over 24-48 hours she became paralysed with no pain sensation

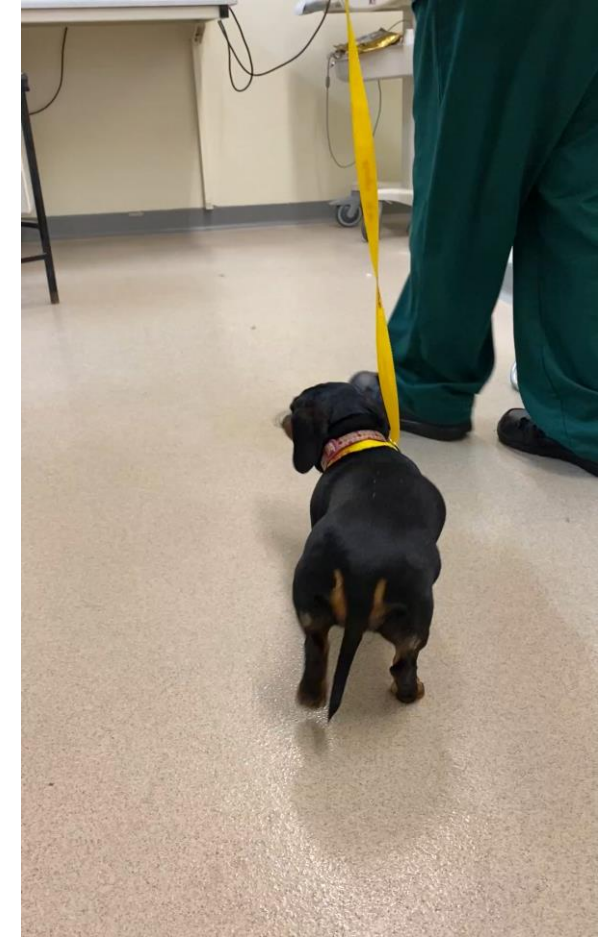
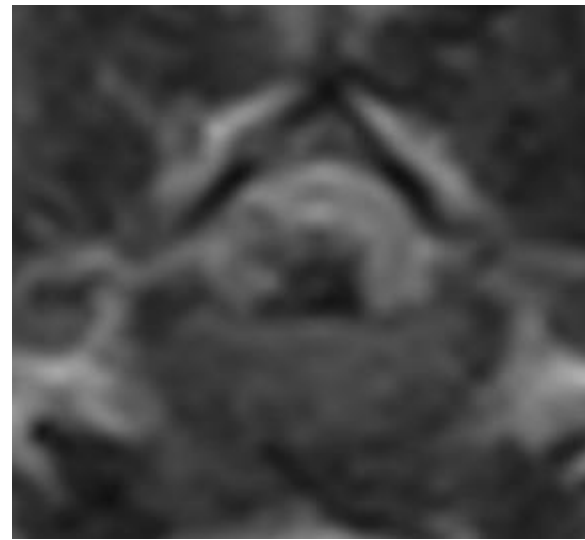
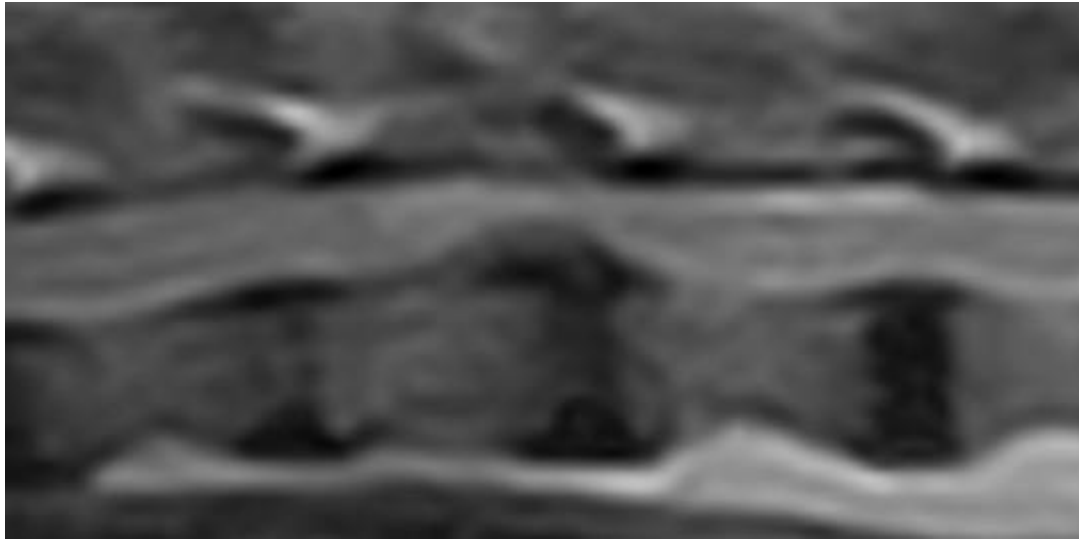


Our first case

- Her MRI showed a T13-L1 disc extrusion



After 12 weeks



What else are we doing?



Further research

1. Intervertebral disc scoring scheme
2. Mineralised disc analysis
3. Tekscan gait analysis



Intervertebral disc scoring scheme

- Several countries in Scandinavia have had an X-ray schemes for years
- This involves taking X-rays of the entire spine in dogs between 2-4 years and counting the number of calcified discs
- Correlation between numbers of disc calcifications and risk of future extrusions
- Breeding recommendations made based on grade assigned following the X-rays
- Highest grade if >5 calcified discs
- In addition to the X-ray scheme run by The Kennel Club and Dachshund Breed Council we aim to perform CT at the same time and compare calcifications seen on CT with those on X-ray
- A pilot study at Cambridge showed CT much more sensitive

Rosenblatt AJ, Bottema CD, Hill PB. Radiographic scoring for intervertebral disc calcification in the Dachshund. *Vet J.* 2014 Jun;200(3):355-61. doi: 10.1016/j.tvjl.2014.03.023. Epub 2014 Mar 27. PMID: 24742872.

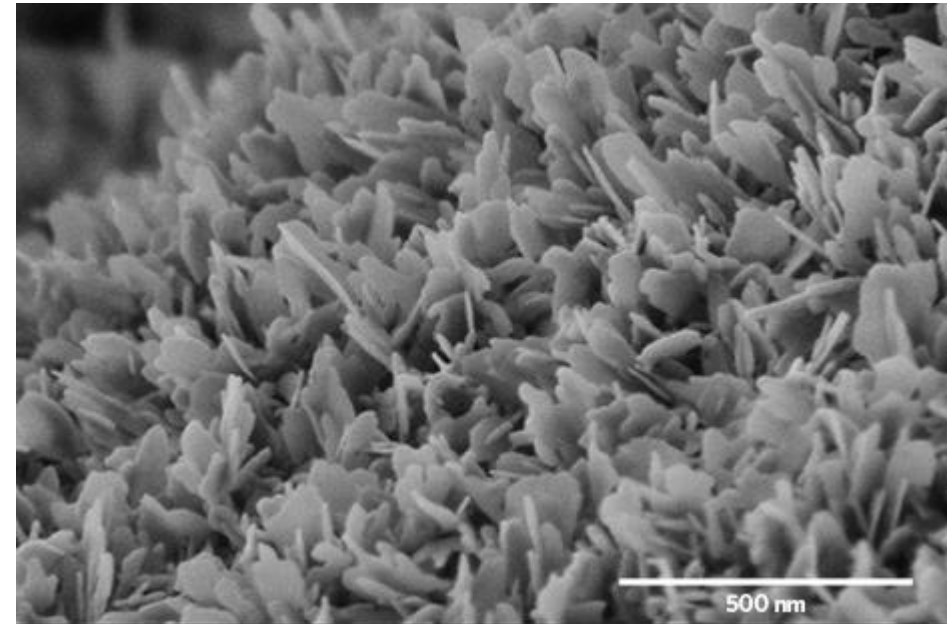


Mineral content analysis

- Earlier I mentioned about disc degeneration and calcification
- We are using FTIR and electron spectroscopy to analyse disc material removed during surgery
- Our aim is to find out if the crystalline structure is related to extrusion, or to the degree of spinal cord damage

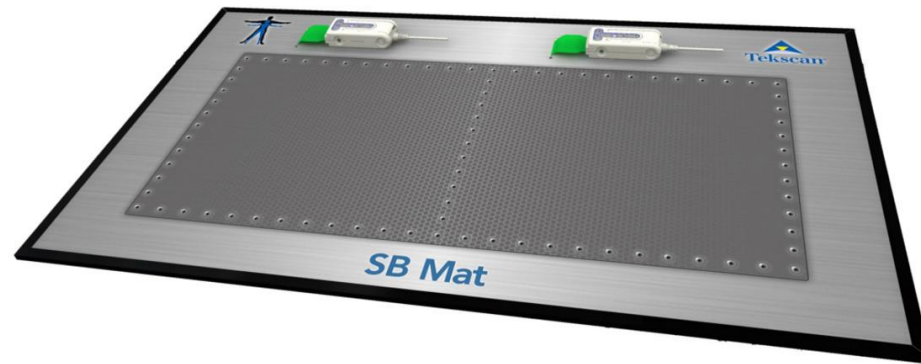
Crystal deposits in the human intervertebral disc:
implications for disc degeneration

Helen E. Gruber et al *The Spine Journal* 7 (2007) 444–450



Tekscan gait analysis

- The Tekscan is a pressure matt which records pressures as dogs walk over it
- We are going to use the gait analysis equipment to try to learn why some dogs learn to 'spinal walk' and some do not
- To develop objective measures of recovery in dogs who have undergone both surgical and medical management



THANK YOU FOR LISTENING

Please follow Cambridge IVDD Research Group on Facebook (@CambridgeIVDD) for more information on intervertebral disc disease and details of research we are doing at Cambridge



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