

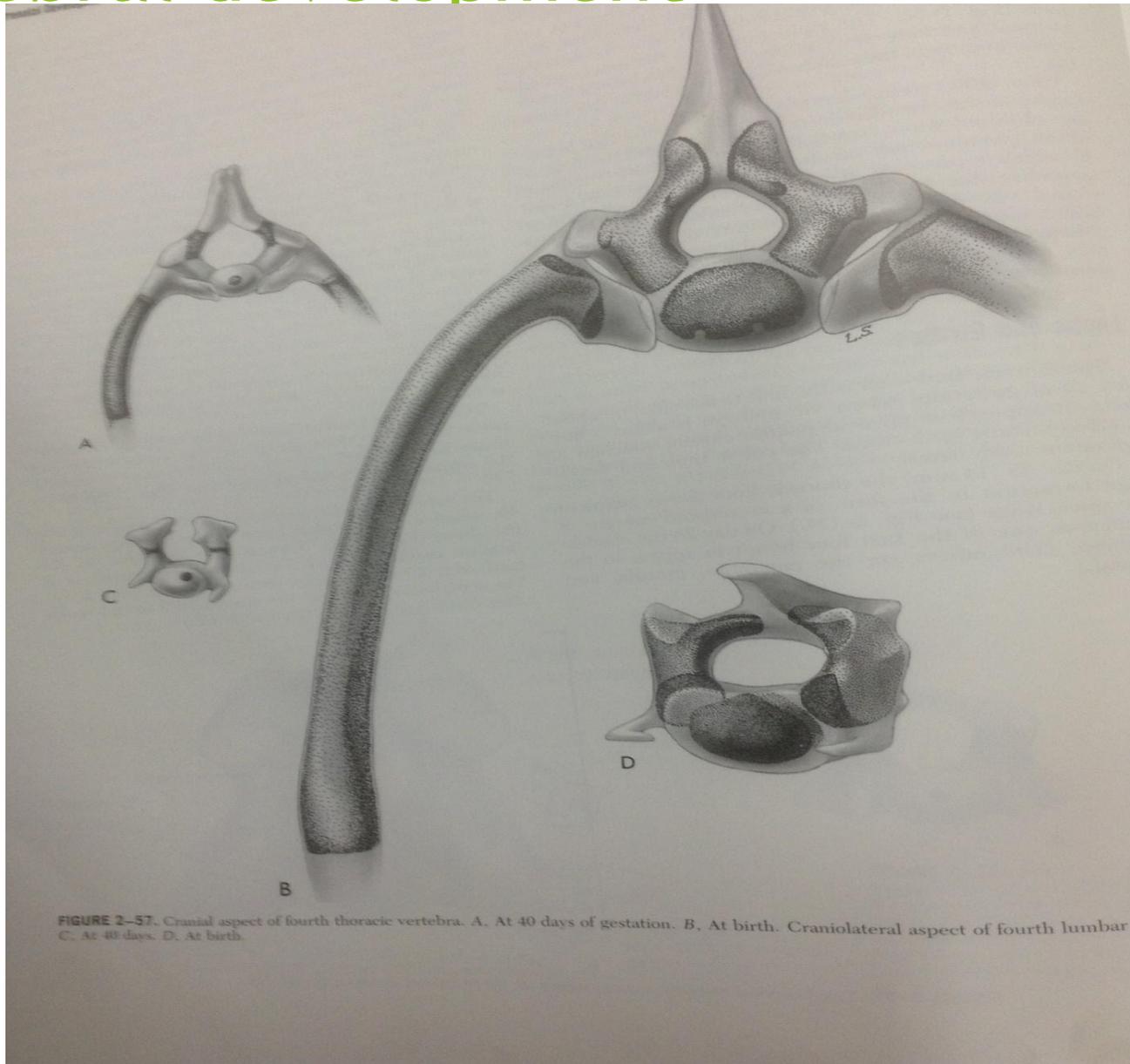
French Bulldogs Backs and Hips

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Normal Vertebrae development

- ▶ Vertebrae develop around the neural tube - the central area down the back line where all nerve tissue develops.
- ▶ The two sides come together below the spinal cord and fuse to become the vertebral body.
- ▶ This happens before 40 days gestation (probably more at 30-33 days). If the two halves fail to fuse correctly, a defective or hemivertebrae results.
- ▶ If the vertebrae fails to fuse over the top of the spinal cord, spina bifida results (open spinal cord).

Vertebral development



Normal Spine

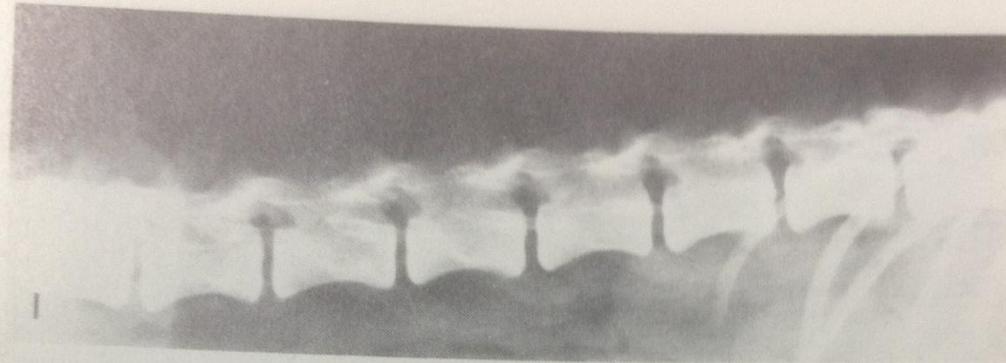


FIG. 17-11I. Left: A lateral radiograph of a normal canine lumbar spine.

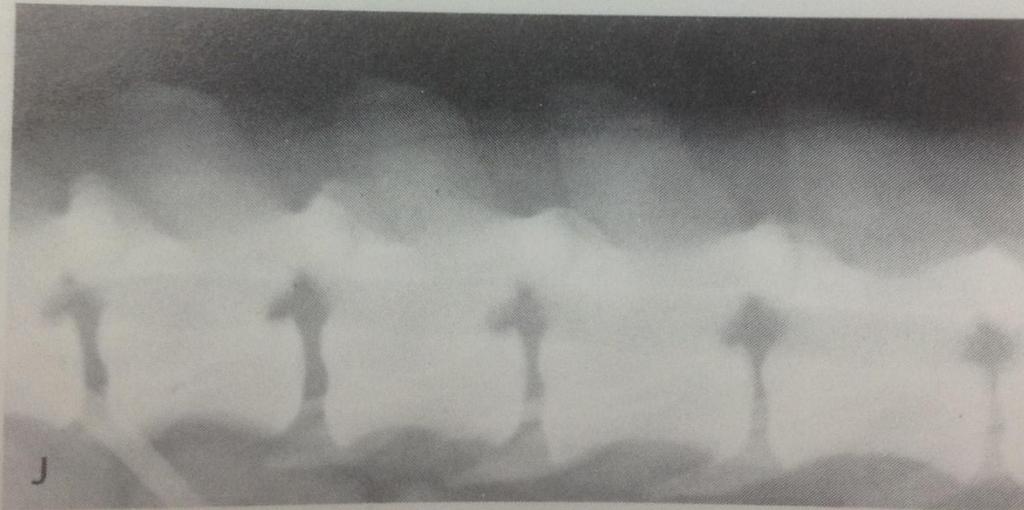


FIG. 17-11J. A close-up lateral view of the first three lumbar intervertebral spaces. Note the uniformity of the intervertebral spaces and disc space.

Spinal cord - myelogram

- ▶ Diagram - there must be a clear, unkinked line for the spinal cord to go through.



Hemivertebrae

- ▶ What are they - these are abnormal vertebrae that have developed incorrectly during pregnancy, they are shortened and misshaped. They are congenital ie. **present at birth**.
- ▶ A hemivertebrae forms when the left and right halves of the developing vertebral body fail to fuse - forming a butterfly shape. Uneven growth of the 2 halves can produce a wedge shape.
- ▶ **Is this an inherited condition** - **yes** - however the mode of inheritance is poorly understood at this stage.
- ▶ The average Frenchie has 3 abnormal vertebrae, the vast majority of which will not cause any problems in the life of the dog.

Abnormal vertebrae - hemivertebrae



Breeds affected

- ▶ Breeds affected are generally Brachcephalic - screw tails are considered to be as a result of hemivertebrae
- ▶ Breeds commonly affected British Bulldogs, French Bulldogs, Pugs, Bostons
- ▶ Does tail length affect the incidence or severity of the hemi's - there appears to be no direct correlation with tail length and number of hemivertebrae (at this stage).
- ▶ Would personally be more concerned with *overly short* bodies - where the vertebrae are more compressed.

Where and number of hemivertebrae occur

- ▶ Vertebrae that are hemi's can be partially wedged, fully wedged or double wedged (butterfly).
- ▶ Most of these will not cause problems in the older dog.
- ▶ The most commonly affected hemis are from T8-13, less commonly are the lumbar vertebrae affected.
- ▶ Hemivertebrae are **very common** in the breed, with the average Frenchie having between 2 to 4 affected vertebrae, with the average being 4.
- ▶ The hemi's within the middle of rib cage are generally reasonably stable (provided they are not causing a deviation of the spine) as they are stabilised by the rib cage.

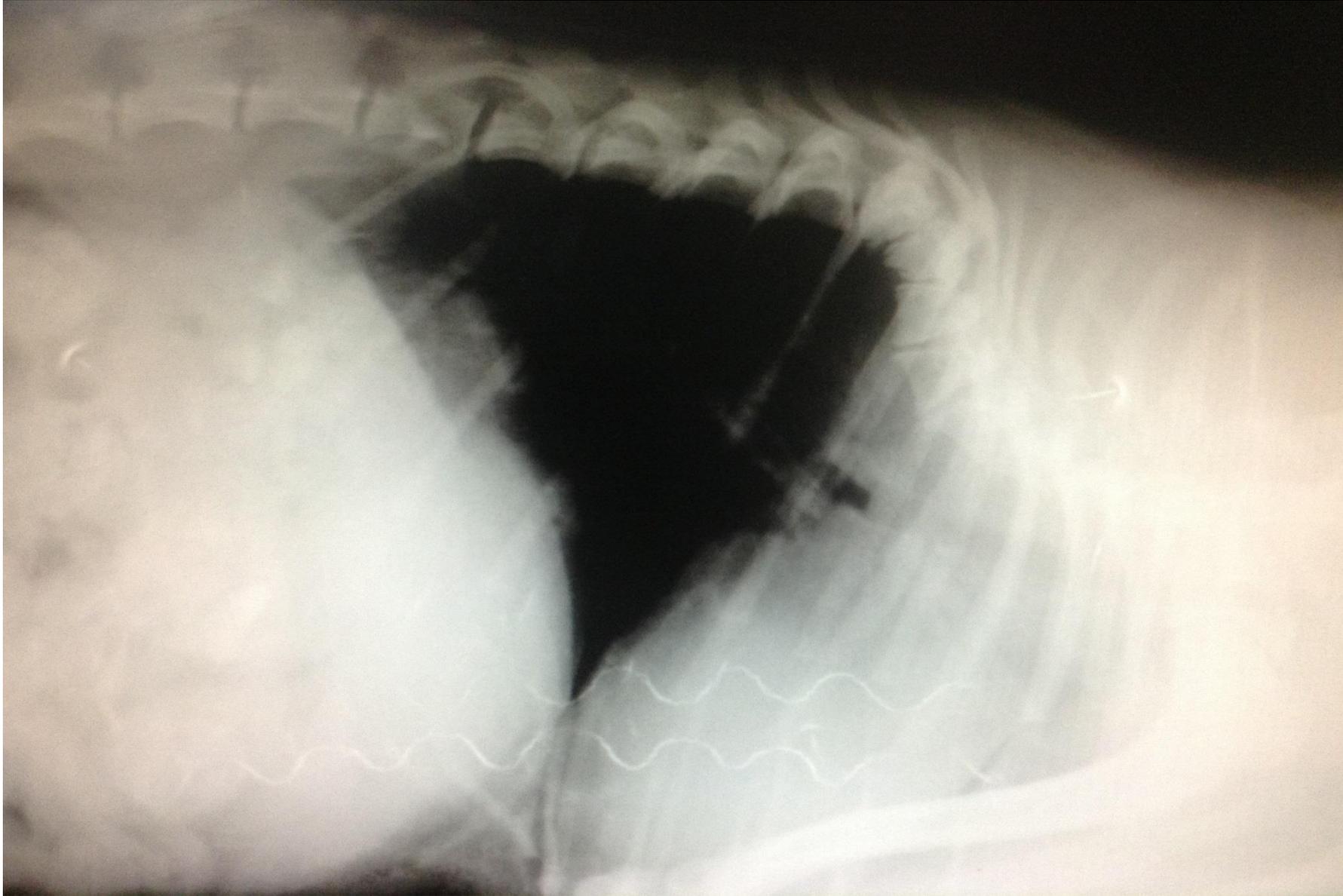
Double wedged (butterfly) hemi



What Hemi's cause problems

- ▶ *Where* these abnormalities occur determines the stability or otherwise of the spine.
- ▶ If ***2 or 3 heavily wedged vertebrae occur together, these may result in a kinking of the spine (kyphosis)***. This can result in severe hindquarter problems due to pinching of the spinal column as the puppy grows. If severe, they are usually seen before 9 months of age and may need to be put down.
- ▶ If the hemis are in the last 2-3 thoracic vertebrae, the back may become more unstable over time, depending on the severity of the deformity of the hemi concerned.
- ▶ Lumbar vertebrae are more likely to become unstable as there are no ribs to help stabilize the vertebrae. Again, the shape (and position) of the vertebrae will give a better idea of long term stability.
- ▶ Mild abnormalities can often be stable long term.

Severe Kyphosis - 7 month old Pug - euthanaised



Scoring Scheme

The scoring scheme we are using (developed in the UK scheme but incorporates the lumbar spine as well) is as follows :-

- ▶ Any partially wedged vertebrae - Grade 1 ie score 1 point.
- ▶ Any fully wedged vertebrae - Grade 2 , score 2 points.
- ▶ Any double wedged (butterfly) vertebrae - Grade 3, score 3 points.
- ▶ **Current (2019) breed average score just under 14 for backs.**
- ▶ Ideally, aim to breed with backs that score less than the breed average, and ideally do not double up on lumbar issues.

Screening of Puppies - why screen?

X ray/screen puppies for several reasons:-

- ▶ ***To establish whether the spine and hips are relatively normal***
- ▶ To obtain an idea of the relative quality of the spines and hips between litter mates as *an extra selection tool* in selecting the best future breeding stock.
- ▶ To eliminate bad backs (and to a lesser extent at this age hips) from breeding programs and to prevent severe abnormalities from being on sold to the general public without disclosure.
- ▶ Puppies should be screened (X rayed) at around 8-9 weeks of age.
- ▶ Puppies do not need to be anaesthetised, rather we roll them on to their sides for the lateral X ray and then roll them again upside down (on to their backs) for the view down through the spine.
- ▶ You do not need a specialist to do these X rays, your local veterinarian can do them, without the need for anaesthetics or tranquilizers.

Ossification of puppy bones

- ▶ Puppy bones start ossifying as early as around day 28 of gestation. They are almost completely ossified (turned to bone) at the time of birth, which is why X rays taken in the last week of pregnancy will outline the bones quite well. X rays taken even 1 week earlier are not nearly as distinct (calcified)
- ▶ The ends of the extremities (the feet) are the last to ossify in the last few days prior to birth. Cartilage does not show up on X rays and cannot support weight on its own without boney support.
- ▶ While any abnormal vertebrae are clearly outlined very early on and are quite clearly visible, any instabilities present at 7-9 weeks of age can result in further arthritic changes over time.

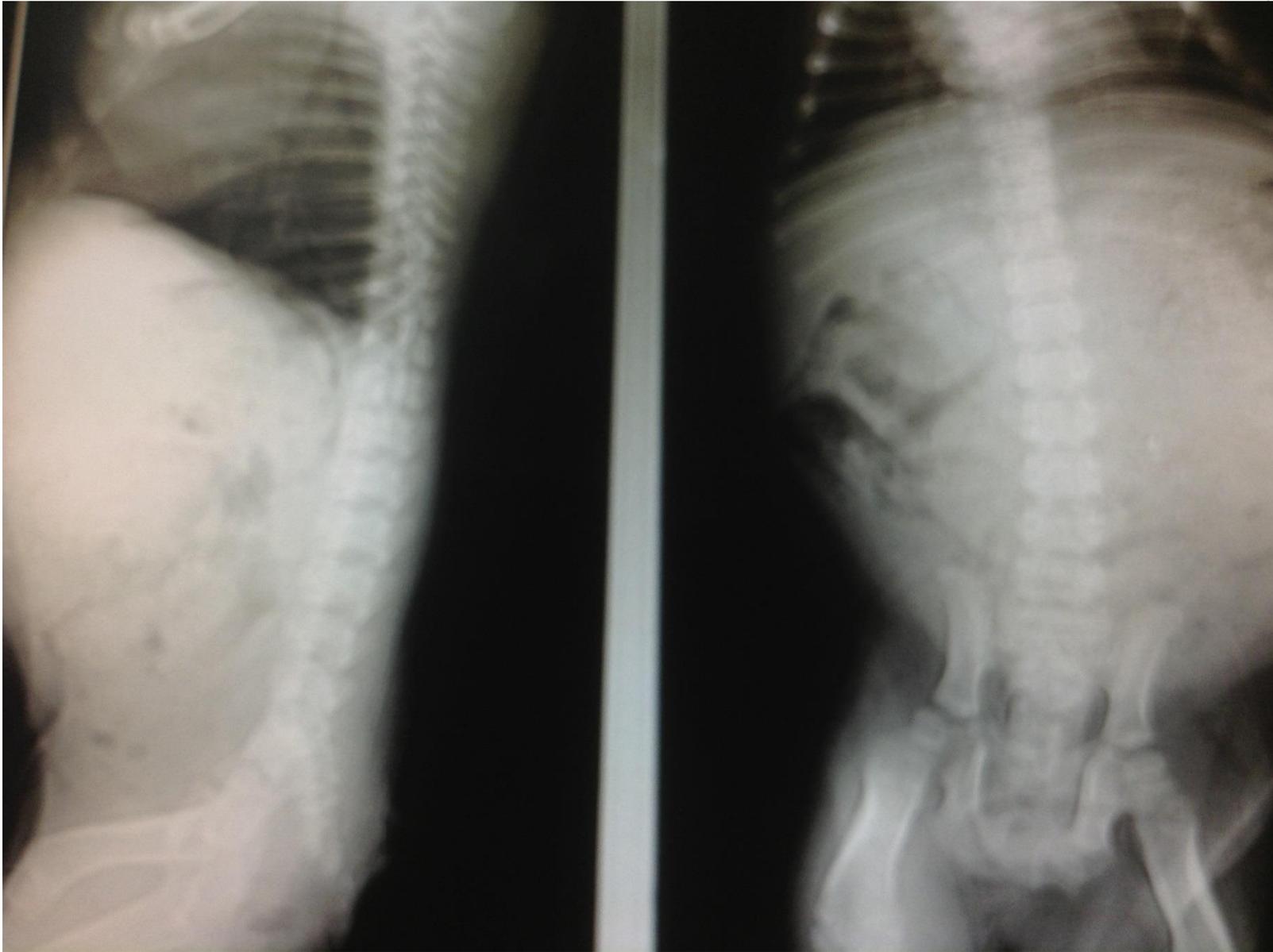
Why screen puppies cont.

- ▶ What these X rays will show is the basic shape and evenness of the vertebrae.
- ▶ ***Severe kinks/bending of the spine and moderate abnormalities of the vertebrae are easily seen.*** Re X raying at 12 months will give a more definite score to the spine and the hips but the early abnormalities will still be present (and occasionally worse due to wear and tear).
- ▶ ***If both parents are X rayed and have very good spines, the odds are that the puppies should have good spines but it is not a guarantee.***
- ▶ Our data is showing clearly that **good backs are on the whole, producing good backs.** It is far safer to know the status of the puppy's spine before sale so that no new owner gets a severe abnormality that they then have to deal with the consequences of down the track.
- ▶ If the puppy has a severe abnormality, the breeder will then have to make decisions as to the long term health outcomes. Whether the breeder keeps the puppy for the time it has, or the puppy is given away with full disclosure of possible problems and outcomes, is a decision the responsible breeder will have to make.

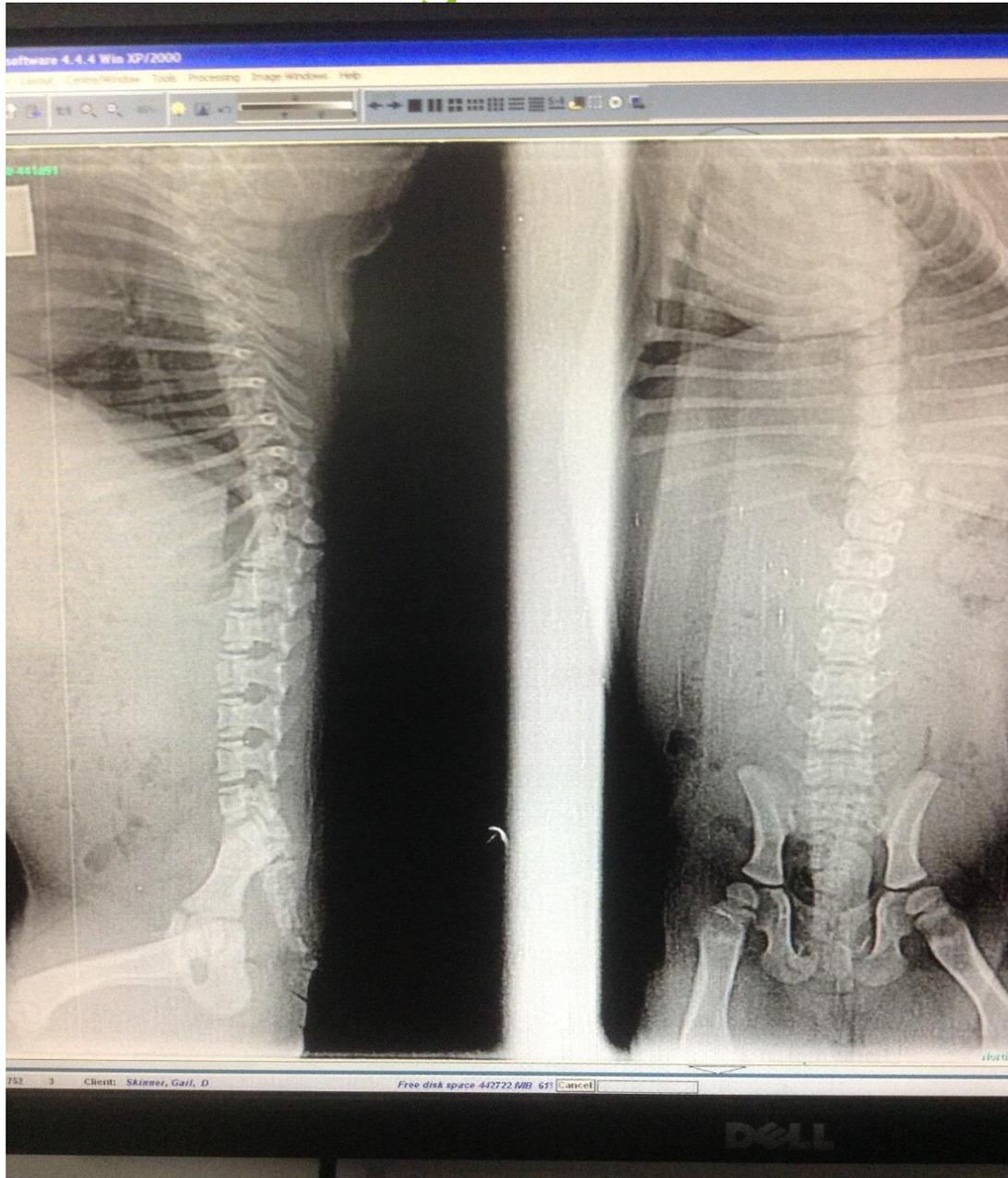
Adult X rays - good back and hips



Puppy X rays - good



Puppy back - not as good



Close up - down through



Adult Back - average, wedge vertebrae



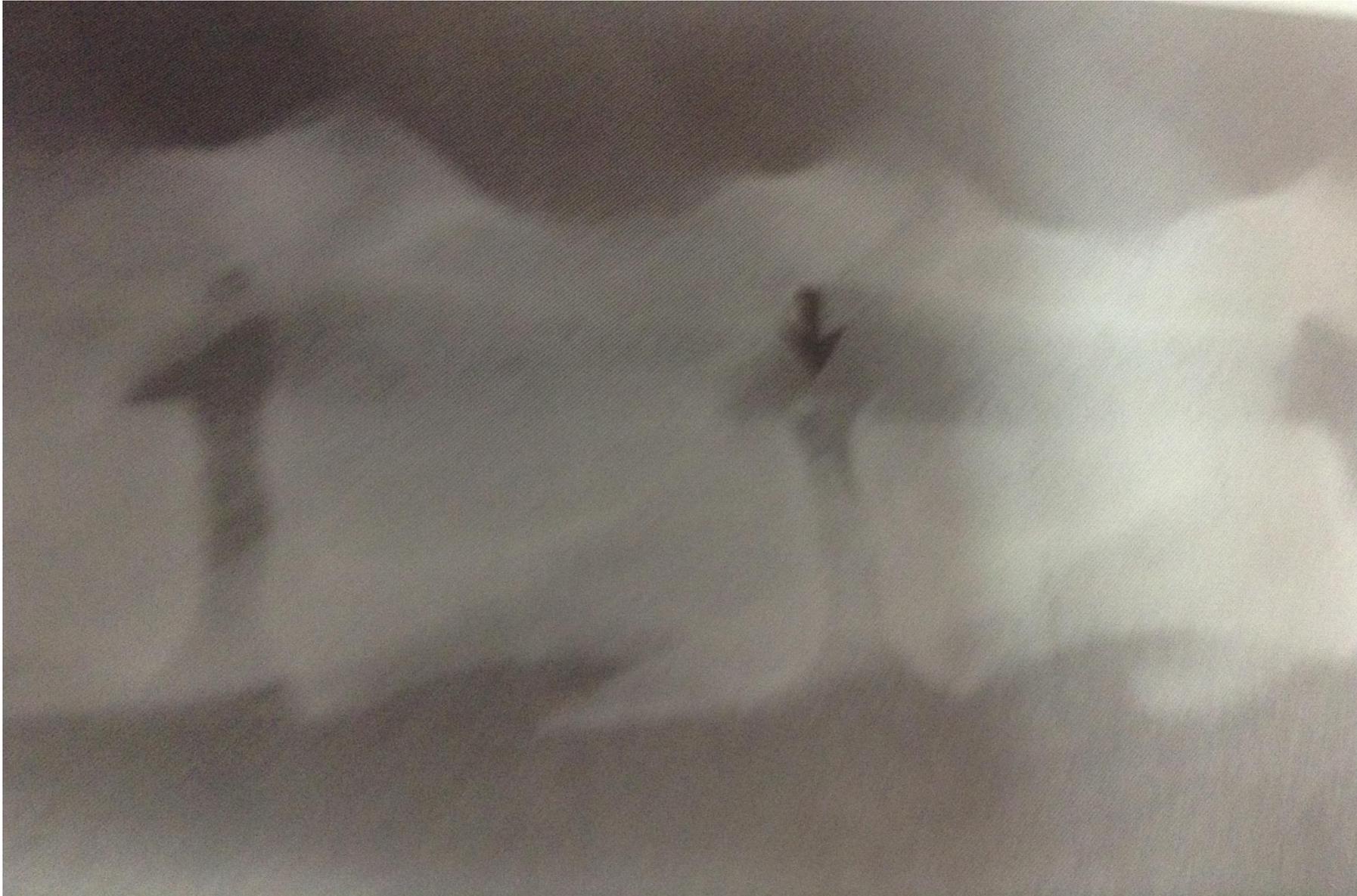
Poor puppy back



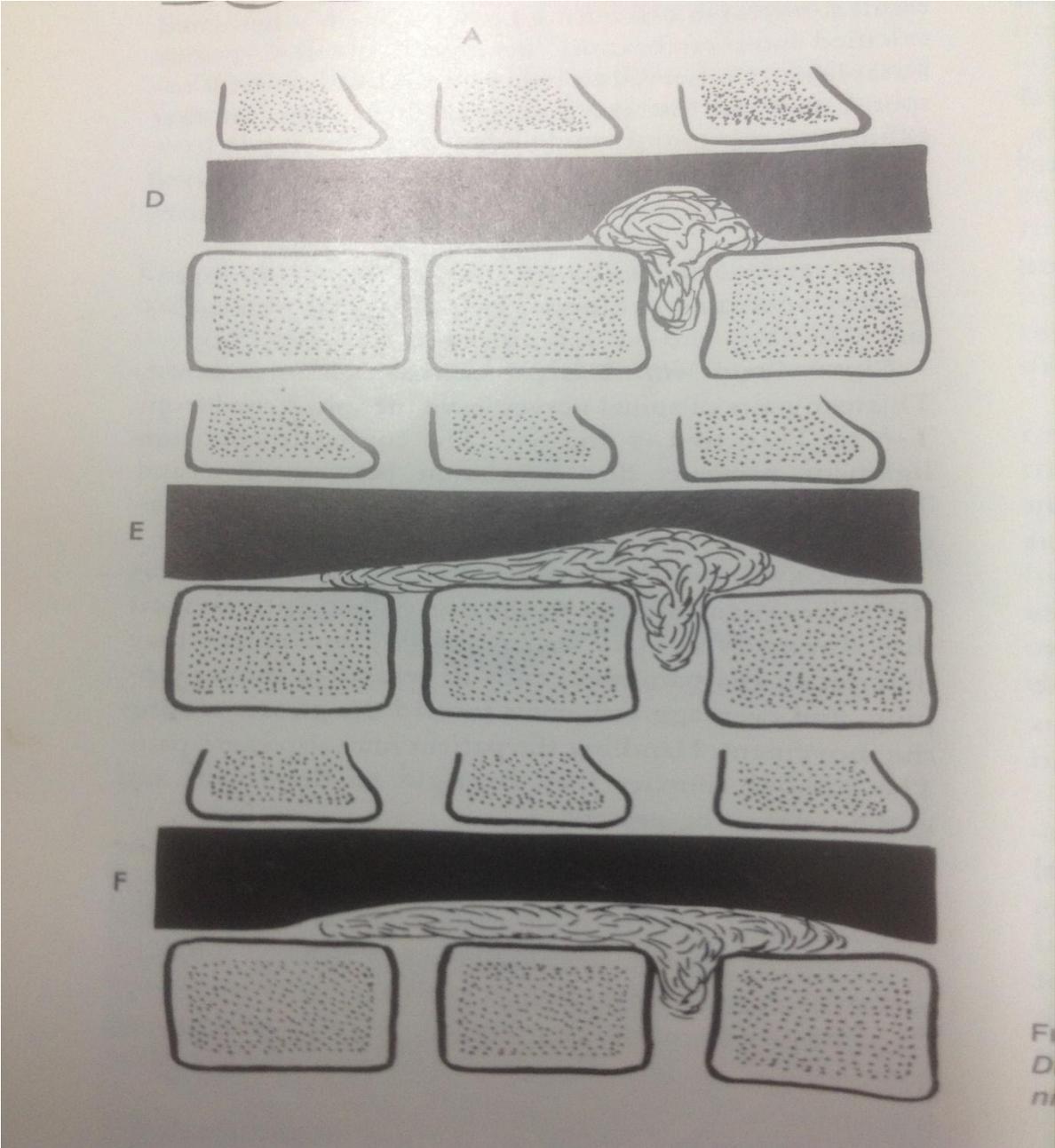
Intervertebral Disc Disease in Frenchies

- ▶ Unfortunately, as Frenchies are known to have Hemivertebrae, it seems to have this automatic flow on the veterinarians that when there is a hindquarter paresis, it is caused by the hemi's when it is **more likely** to be either:-
- ▶ Simple pinching of the spine from overactive dogs, or
- ▶ Intervertebral disc disease - which is often totally separate from the hemivertebrae - this is usually secondary to calcified discs which protrude.
- ▶ These dogs have sudden onset of paresis (unable to stand in the hindquarters). ***Most respond very rapidly*** to rest and anti-inflammatory medication (within 1-3 days).
- ▶ Failure to rapidly improve with medication or a lack of nerve response indicates severe pinching of nerves and may require surgery fairly quickly.
- ▶ Usually older dogs are affected - 5-6 years onwards generally.
- ▶ Severe intervertebral disc disease is not as common today as previously.

Intervertebral disc disease - calcified disc



Disc herniation

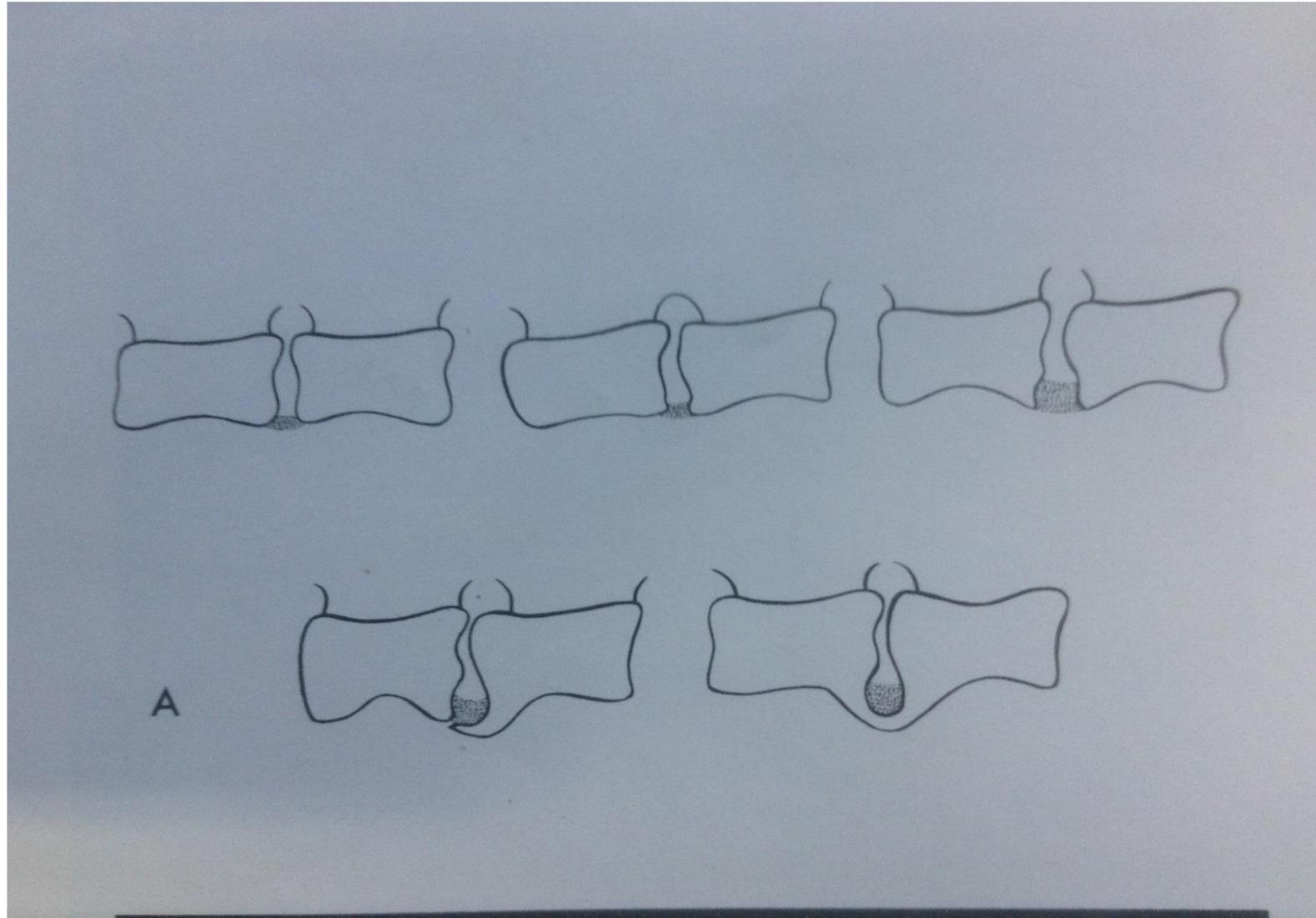


Spondylitis

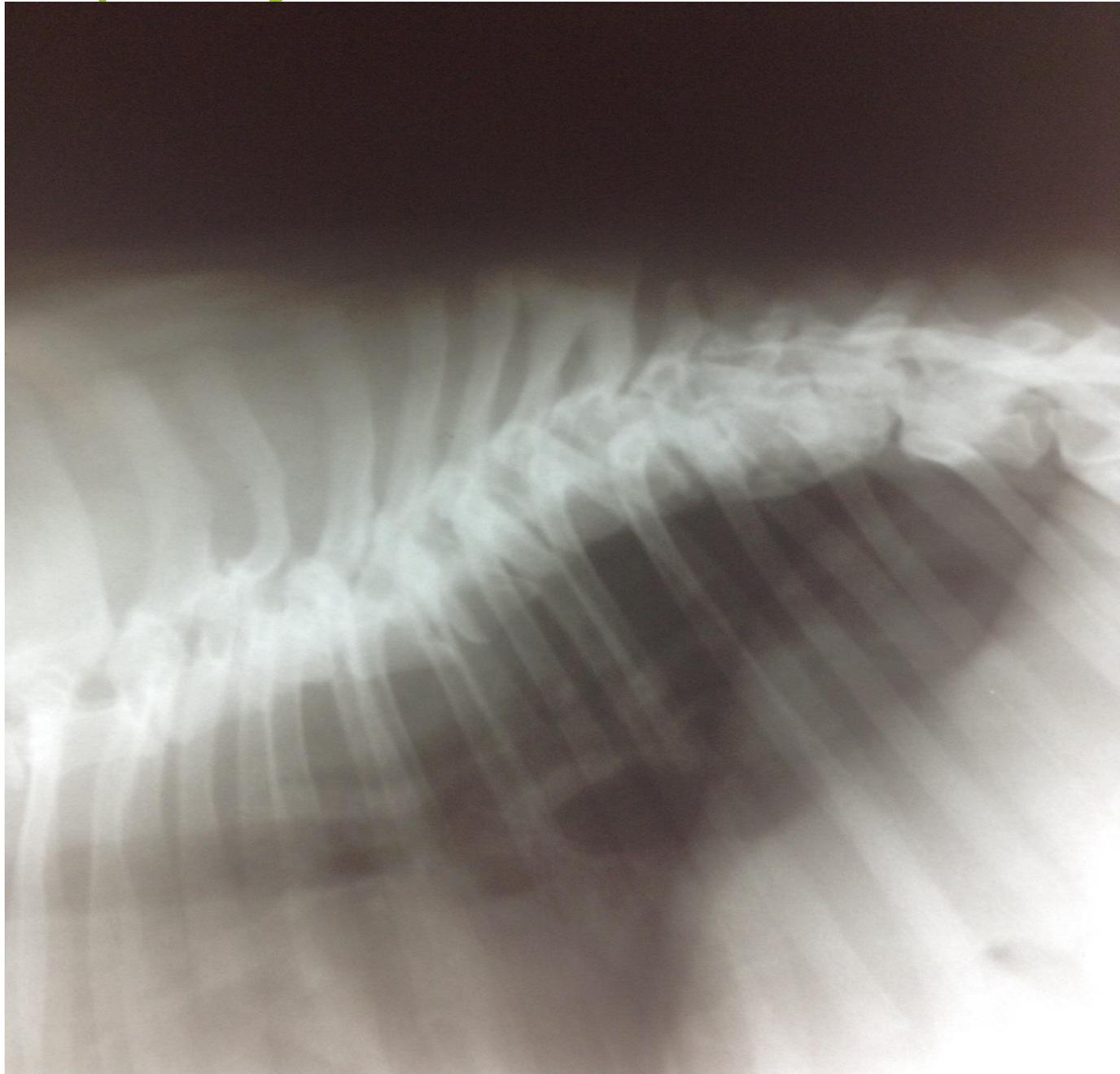
- ▶ These are the boney changes that occur between vertebrae.
- ▶ These changes are seen (predominantly) below the vertebral bodies.
- ▶ Spondylitic changes are very common around instabilities ie. Hemivertebrae.
- ▶ These changes are in themselves, generally very stable.
- ▶ They are prone to lateral damage as they make the back more rigid.

Development of Spondylitis.

Sequence of events showing the development of spondylitis, common changes with age



Bad spondylitis 15 month old bitch



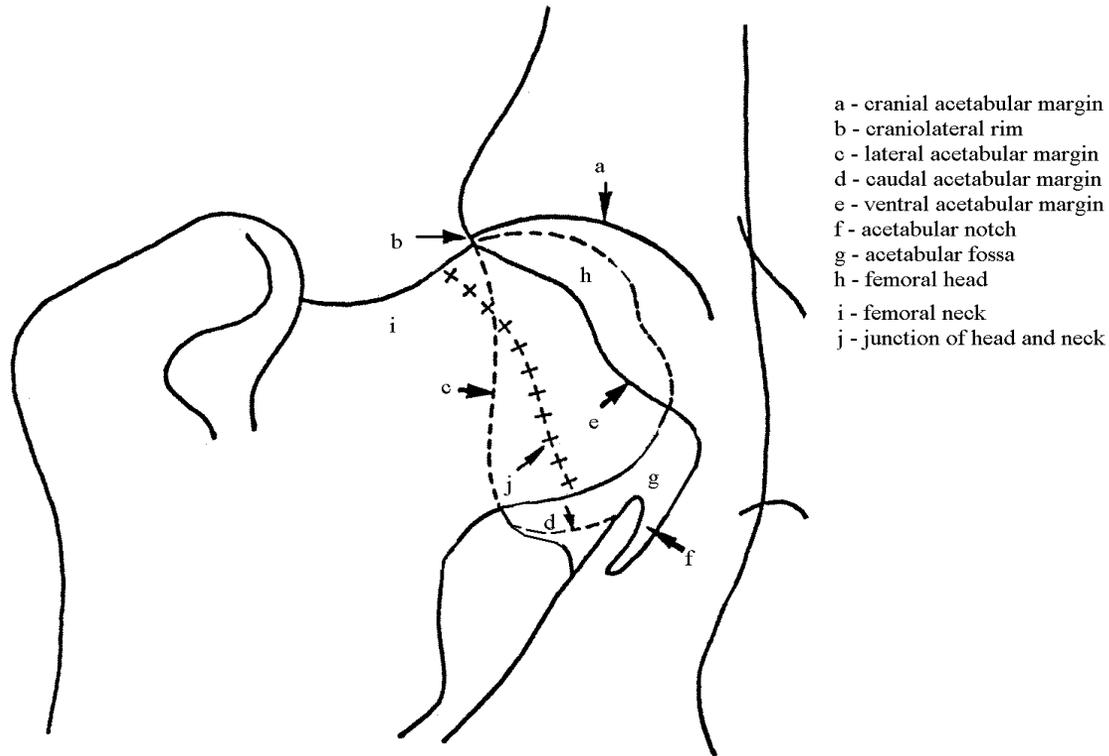
Some generalisations on backs

- ▶ Severe abnormalities (kyphosis/lordosis) should not be bred with. Many develop hindquarter abnormalities, urinary and faecal problems by 7-8 months of age. Generally these have poor long term outcomes.
- ▶ Mild/moderate humps in stable areas (and reasonable stable shapes) **are usually stable long term.**
- ▶ Back injuries/soreness is not uncommon in the breed, but the majority of these are **short term episodes** that respond readily to anti-inflammatory treatment and rest.
- ▶ **Disc disease** is usually not seen under 4-6 years of age. Disc disease is accompanied by neurological deficits in the hindquarters.
- ▶ Many of these cases will respond well to anti-inflammatory treatment and rest.
- ▶ Surgical treatment on the spine should not be the first line of treatment unless there is significant neurological deficit/damage and there is little or no response to treatment ie. Reserved for severe cases.

Hip Dysplasia - an ill fitting hip

The hip joint is a ball and socket joint, the deeper the socket the better.

- ▶ Good hips have a well shaped head, neck, deep socket and tight ligaments.
- ▶ Each hip is scored out of 53 points, in 9 different areas. 0/0 best, 53/53 worst



- a - cranial acetabular margin
- b - craniolateral rim
- c - lateral acetabular margin
- d - caudal acetabular margin
- e - ventral acetabular margin
- f - acetabular notch
- g - acetabular fossa
- h - femoral head
- i - femoral neck
- j - junction of head and neck

Anatomical Points of the hip.

Hip Dysplasia in Frenchies

- ▶ This is considered ***a problem*** in the breed.
- ▶ This breed is considered one of the worse breeds affected in the USA (4th worst).
- ▶ In Australia, I would consider it a moderate problem eg. British Bulldog average up around 34.
- ▶ The number of dogs that we now have screened (>100) means that we now have a reasonably stable (and realistic) breed average.
- ▶ ***The current breed average is around 17, (breed median 14) with a range from 1 to 67.***

Excellent Frenchie hips



Hip dysplasia - breed advice

- ▶ The vast majority of the dogs screened are below 20 in score. Realist breeding advice at this stage would be to ***breed with care with any dogs who score over 30.***
- ▶ Ideally, unless it is an outstanding example of the breed, dogs who score over 30 will have ***a much higher risk*** of producing poor hips in their progeny. While one may risk a litter with an outstanding bitch with a higher score, placing a stud dog at public stud would be a very risky venture.
- ▶ Dogs that score >20, should ideally go to partners with scores at or ideally well below the breed average.
- ▶ ***Repeat litters from a high scoring parent*** should be delayed until the puppies from the first litter are screened. If the results are very good, a second litter may be attempted, however if the results are well above the average, it is probably inadvisable to breed with that animal again.

Bad Hips



Bad back (which went with the above hips!)



Summary - Breed Advice

- ▶ Screening of breeding stock allows the breeder to know what they **can afford to do** with that animal.
- ▶ A dog with a higher hip score should go to one with a low score or one who has a low breed average in his progeny.
- ▶ A dog with a high back score should ideally go to one with a low back score.
- ▶ A dog with a high hip **and** back score should ideally not be bred with unless there are extenuating circumstances that would warrant the risk.
- ▶ The reward for the screening of breeding stock is sounder progeny, and a sounder breed overall, over time.