

UNDERSTANDING RADIOLOGY

Anne Arundel Veterinary Emergency Clinic

IONIZING RADIATION

A type of energy released by atoms that travels in the form of electromagnetic waves (gamma or X-rays) or particles (neutrons, beta or alpha).



Power lines



Radio & Cell Phones



Microwave



Infrared



Visible



Ultra Violet



X-ray



Gamma ray

01

HAZARDS



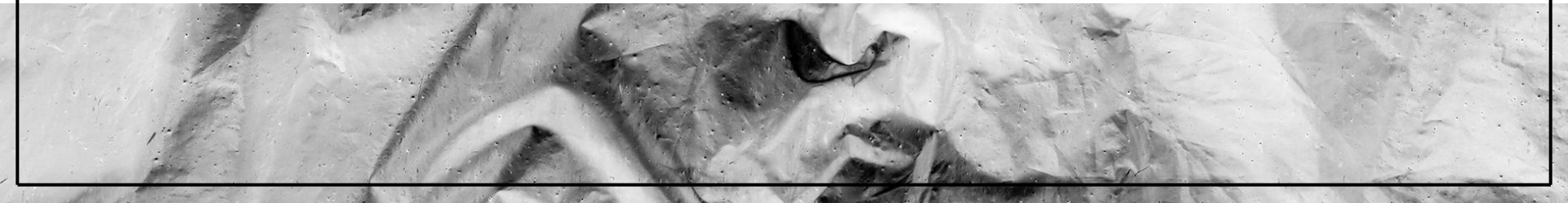
DAMAGING CELLS

In human adults, tissues that are readily sensitive to radiation include bones, lymphatic tissues, dermis, and epithelial tissues. The eyes and thyroid are also very sensitive.

Persons under 18 years of age and pregnant women are not allowed to take X-Rays.

10 DAYS TO 6 WEEKS

**EXPOSURE CAN CAUSE SKELETAL & DENTAL
MALFORMATION AS WELL AS GROWTH RETARDATION**



**NO
AMOUNT IS
NON -
DAMAGING**

Somatic damage is more extensive when the body is exposed to a single massive dose, but it can also result from several smaller doses administered over many years.

Cancer, cataracts, aplastic anemia, and sterility are samples of somatic damage.

Genetic damage from radiation occurs in the form of injury to the DNA in the genes of reproductive cells and is not detectable until future generations are produced.

THE STRENGTH OF THE X-RAY

- kVp = Peak Kilovoltage = Refers to the maximum high voltage applied across an X-ray tube during the creation of x-rays within it.

THE NUMBER OF X-RAYS

- mA = Milliampere = Determines the heat of the filament, the hotter it is the more electrons that are emitted. The more electrons crossing the x-ray tube the higher number of x-rays that result.

THE EXPOSURE TIME OF THE X-RAYS

- mAs = Milliampere - Seconds = a measure of radiation produced over a set amount of time (seconds) via an x-ray tube. It directly influences the radiographic density, when all other factors are constant.

The higher the mAs the more exposure to personnel.

Therefore, the lower the mA and the shorter the exposure time, the less the patient/operator radiation dose.

High kVp with a thicker body part can lead to secondary scatter radiation. The one most proactive step you can take is to COLLIMATE.

COLLIMATE



COLLIMATE

COLLIMATING DOES 2 THINGS

1. It cuts down on secondary scatter coming off the patient, which affects film quality. Scatter coming off the patient will artificially darken the radiograph; this is called *film fog*.

COLLIMATING DOES 2 THINGS

2. Cuts the scatter to the personnel. Not only is collimating good for the radiographs, it is also one of the major rules of Radiology. You must show collimation on two opposing sides (a Federal and State Guideline).

AAHA STANDARDS

AAHA guidelines state that you must show collimations on all four sides. Digital detectors are very sensitive to scatter radiation. Whatever is outside the primary radiation field will show up on the image. If people are holding the patient on the table their hands will show up if they are not wearing protective gloves.

HOW MUCH IS TOO MUCH?

It would be extremely rare that any veterinary technician could ever receive this amount of exposure using modern equipment. The use of appropriate collimation, rare earth screens, proper protective apparel, and good techniques greatly reduces personnel exposure to x-rays.

DOSIMETER BADGES

- Your individual dosimeter badge is located outside of X-Ray 2 along the door frame.
- You must clip them at collar level outside of your apron or thyroid shield for every x-ray taken.
- They will measure how much radiation you are exposed to.





PROTECTION GEAR

- Thyroid Shield
- Apron
- Gloves
- Eye Protection

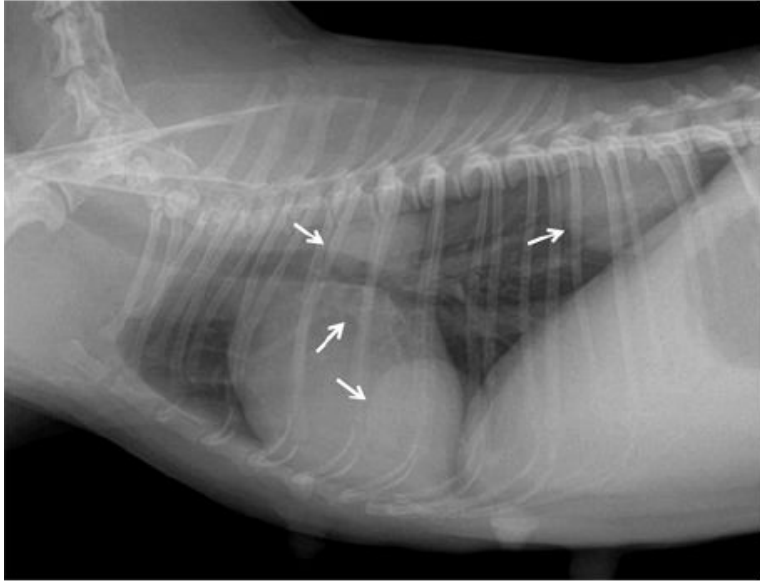


X-RAY TERMINOLOGY

- VD - On Their Back
- DV - On Their Stomach
- LATERAL - On Their Side
- C-SPINE - Neck Spine
- T-SPINE - Chest Spine
- L-SPINE - Lumbar Spine
- L / R - Left & Right
- STIFLE - Knee
- DIGIT - Toes

2 VIEW THORAX X-RAYS

A



B



LATERAL ABDOMEN X-RAYS



BLOAT ABDOMEN X-RAYS



STIFLE FRACTURE X-RAYS



RADIUS ULNA FRACTURE X-RAYS



COLLAPSING TRACHEA X-RAYS



1

T-SPINE X-RAYS



GUNSHOT X-RAYS



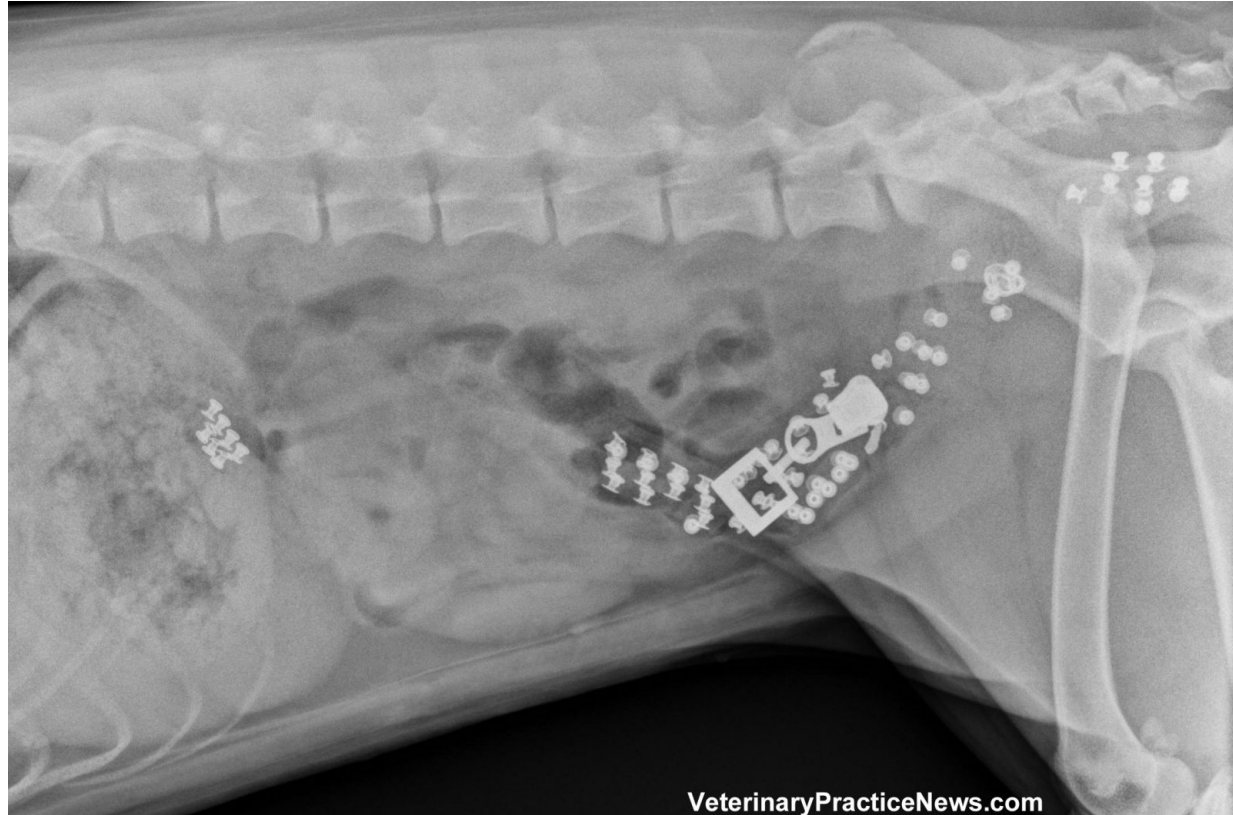
GUNSHOT X-RAYS



FISHING ROD INGESTION X-RAYS



FOREIGN BODY INGESTION X-RAYS



PELVIS X-RAYS



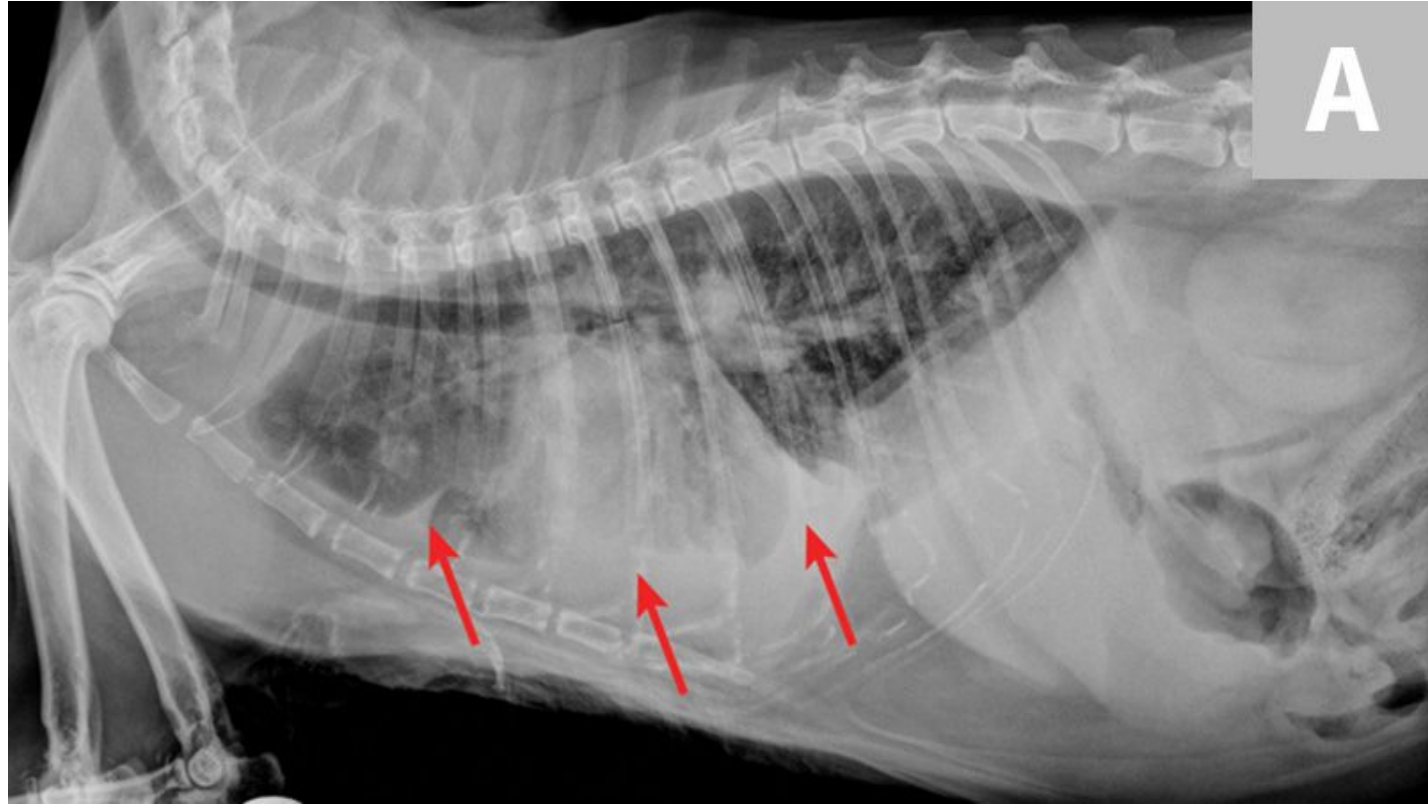
DIGIT X-RAYS



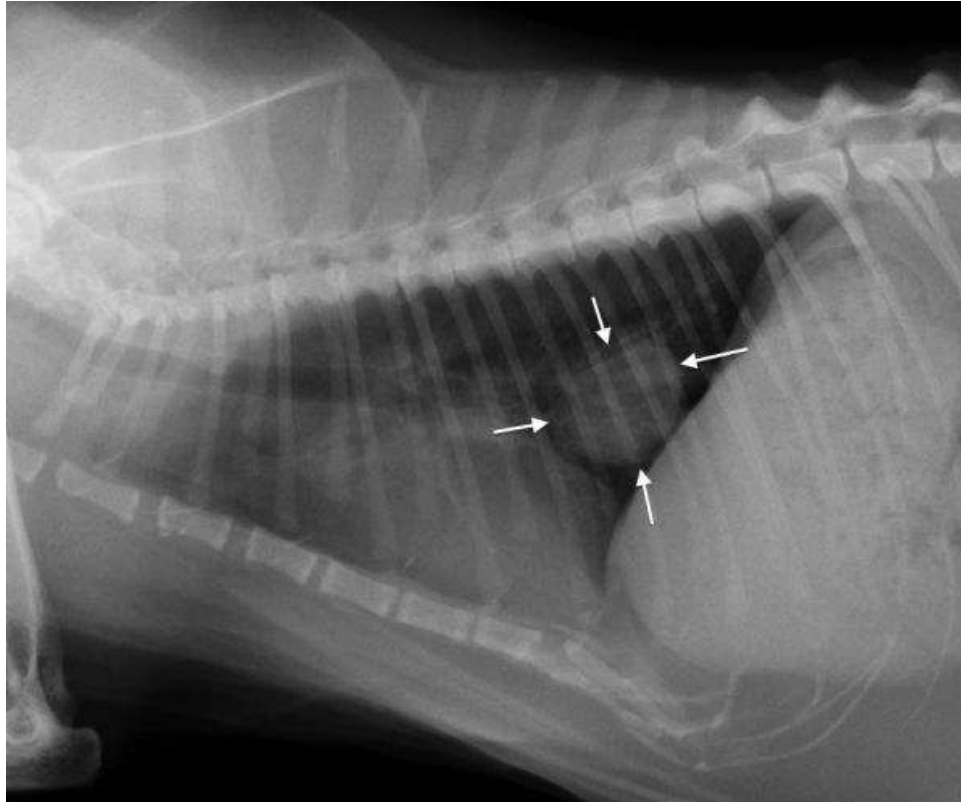
WHOLE BODY X-RAYS



PULMONARY DISEASE X-RAYS



CANCER X-RAYS



MEGACOLON X-RAYS





THANKS

Do you have any questions?

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