

Feline Anesthesia and Analgesia



Table 1—Mean No. of procedures performed each month in various species by individual veterinarians in Colorado

Procedure	Dog	Cat	Horse	Other
Castration	11.6	11.9	2.6	10.4
Ovariohysterectomy	12.6	11.8	0.6	2.4
Dentistry	13.5	9.5	0	1.4
Onychectomy (cats)	0	5.3	0	0
Stifle joint surgery	1.6	0.3	0.3	0
Fracture repair	1.3	0.9	0.2	0.6
Laparotomy	1.6	1.2	1.3	5.2
Radiography under anesthesia	7.2	3.2	0	2.0

Survey anesthetic techniques & concerns in private veterinary practice. A. Wagner, et al, JAVMA, 217, 1652, 2000.

Table 3—Summary of answers (No. of respondents) to the question "Do you routinely administer postoperative analgesics following any of the procedures indicated below? If yes, please indicate analgesic used."

Procedure	Analgesic						
	No	Yes	B	C	M	K	Other
Dog castration	183	98	53	23	12	7	25
Dog spay	161	130	66	37	18	8	26
Cat castration	230	62	41	4	2	7	8
Cat spay	190	104	77	5	4	10	17
Cat onychectomy	88	205	141	5	10	16	29

B = Butorphanol. C = Carprofen. M = Morphine. K = Ketoprofen.

Other = Drugs cited \leq 5 times/procedure (aspirin, flunixin, etodolac,^d buprenorphine, meperidine, oxymorphone, fentanyl, fentanyl patch, codeine and acetaminophen, medetomidine, corticosteroids, diazepam, and acepromazine [also bupivacaine and lidocaine for cat onychectomy]).

The Cat's pyjamas



For safety and confidence
in cat anaesthesia...

Features of felines:

- # Metabolism
- # Hyperthermia
- # HCM
- # Feral Cat Programs
- # Peri-Operative Analgesia
 - Declaw Pain



Metabolism of Drugs

- Cats have relatively deficient hepatic glucuronidation mechanism
- Fewer hepatic UDP-glucuronosyltransferase (UGT) isoforms, perhaps due to strict carnivorous diet and lack of exposure to plants and phytoalexins
- Lack of morphine-6-glucuronide formation
- Toxicity of acetaminophen and other phenols and NSAID's



Anesthetic Hyperthermia in Cats:

- # Drugs and stressors implicated
- # Some opioids implicated:
 - hydromorphone, oxymorphone, fentanyl (Duragesic patches), morphine
- # Dose dependent (+/-)
- # Reversal of opioid with antagonists
- # Symptomatic / Supportive treatment
 - Vasodilation, sedation, active cooling
 - Monitoring to avoid over-correction

Hypertrophic Cardiomyopathy

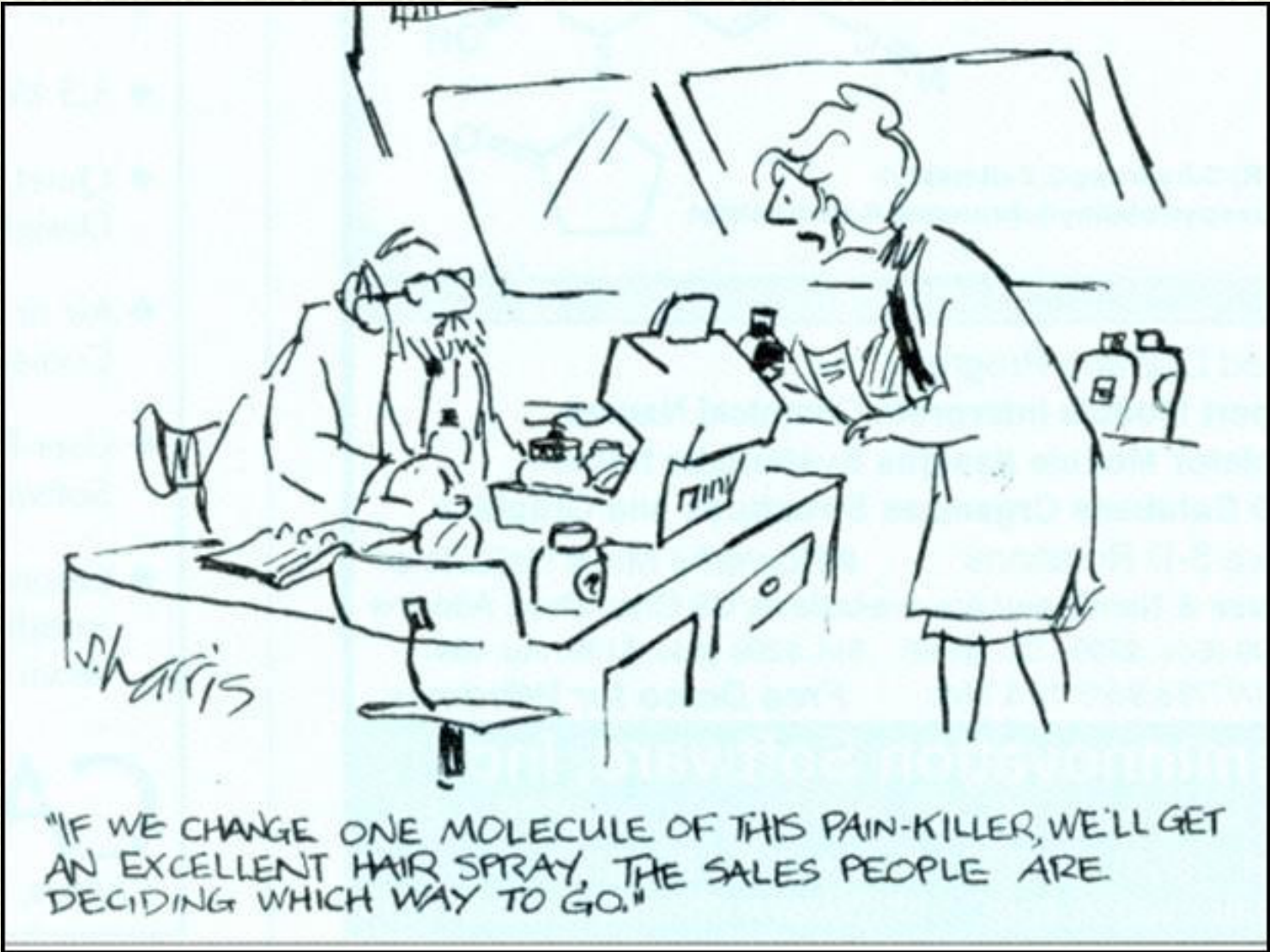
- # Subclinical HCM is a nasty silent killer
- # It converts an otherwise very safe and useful anesthetic techniques into a substantial threats to survival
- # HCM plus ketamine or Telazol kills lots of cats!
So can HCM plus isoflurane!
- # No adequate and practical screening tests as yet

Hypertrophic Cardiomyopathy

- # HCM is a failure of relaxation (lusitropy), rather than contraction
- # Limited ventricular volume and limited coronary blood flow
- # Priorities:
 - slow heart rate
 - maintain preload

Anesthetic Techniques for cats with (suspected) HCM:

- # Minimize stress and excitement
- # Avoid acepromazine (to maintain preload)
- # Avoid anticholinergics
- # Benzodiazepine (midazolam)
- # Medetomidine (controversial ?)
- # Opioids
(butorphanol, hydromorphone, buprenorphine)
- # Propofol, Etomidate
- # Halothane, Isoflurane, Sevoflurane (best)
- # Fluid therapy
- # Monitoring and Support



Our market-driven economy controls the availability of pharmaceuticals, and we have many new and excellent anesthetics and analgesics for cats.

NSAID's in cats:

- # Meloxicam, 0.1 mg/kg, q24h. For 2-3 days
(0.1 mg/cat, oral suspension, one drop q24h)
- # Ketoprofen, 1.0-2.0 mg/kg, SC, IM initially,
then 0.5-1.0 mg/kg, PO, SC, q24h
- # Carprofen, 1.0 mg/kg, PO, (1-2 doses only),
q24h

“Old School” - Aspirin in cats:

- No effect in severe pain
- Reduction of chronic mild to moderate pain
- Risk of GI and renal toxicity, individual variability
- Analgesic Dose:
- Cat: 10-15 mg/kg, PO, q 48-72 hours

One “baby aspirin” for average cat every three days

Note the much longer dosing interval than in other species, leading to a greater risk of overdose (due to error) and greater toxicity than in dogs.

NSAID's to Avoid in Cats:

Ibuprofen

Indomethacin

Naproxen

Acetaminophen

All are extremely toxic in cats.

Buprenorphine for cats

- # Excellent oral transmucosal availability in cats
(but not in dogs)
Nice to send home for post-op analgesia in cats
- # Long duration of action
- # Ceiling effect on respiratory depression, but perhaps not on analgesic effect
- # Slow onset of analgesia and sedation, even after IV administration

Lidocaine CRI in Cats:

- # Anesthetic and analgesic effect only at high doses approaching toxicity
- # Not worth including - with a few exceptions



Propofol Toxicity in Cats

- # 2,6, di-isopropyl phenol
- # Phenol toxicity upon repeated or continuous use
- # Propofol is still a very useful anesthetic for cats - with some limitations

Feral Cat Neuters and Spays

- # Large production, assembly (disassembly) line scale, minimal costs and maximum yields, volunteer staff, strict protocols
- # Dr. Julie Levy, et al.
- # Feral Fixin's
 - TKXBup + Meloxicam

Principles in Pain Management

Preemptive analgesia

Pre operative analgesics (as well as post op)

Balanced analgesia

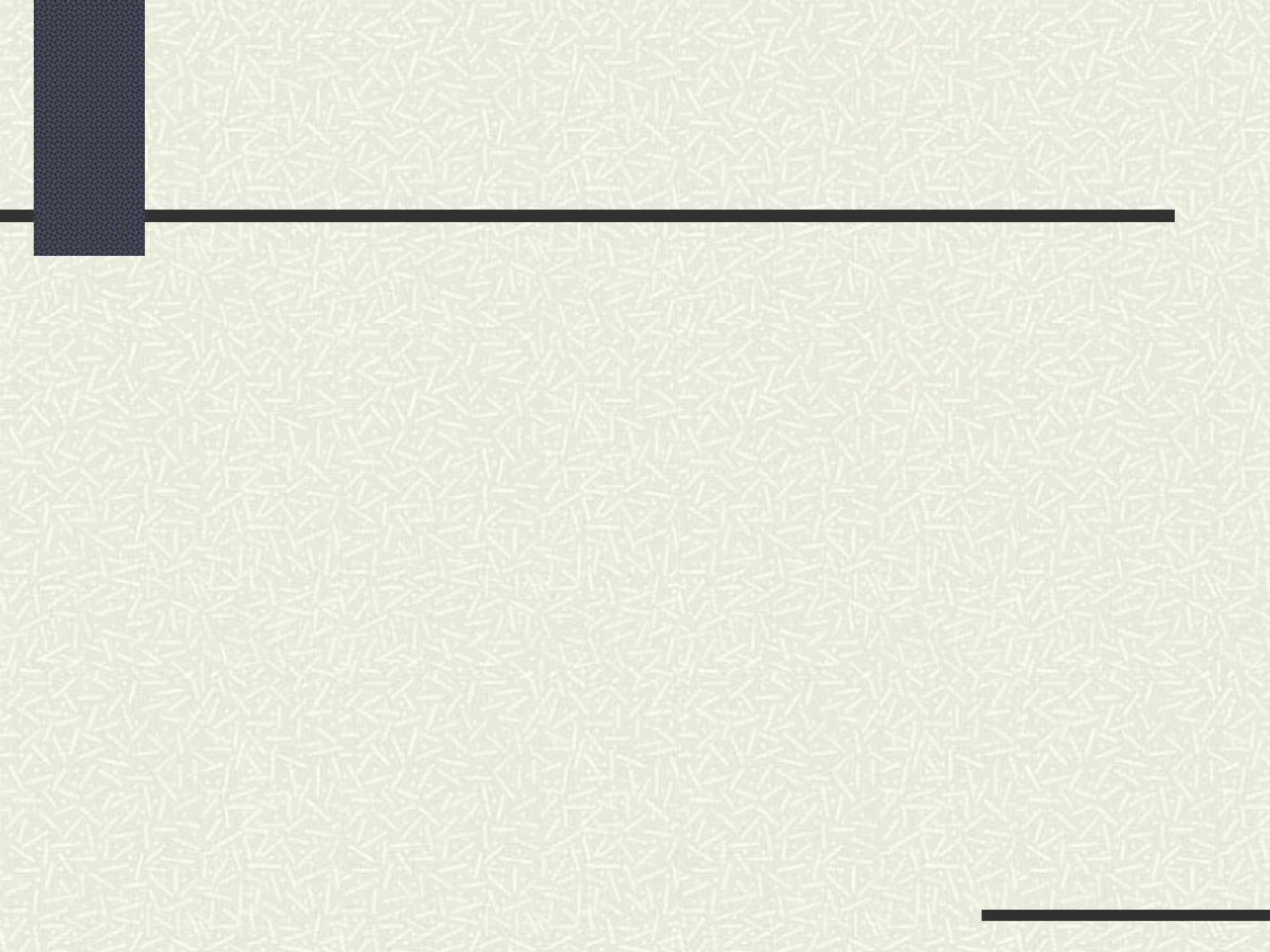
Combined multi-modal strategies
(opioids, locals, dissociatives, NSAID's)

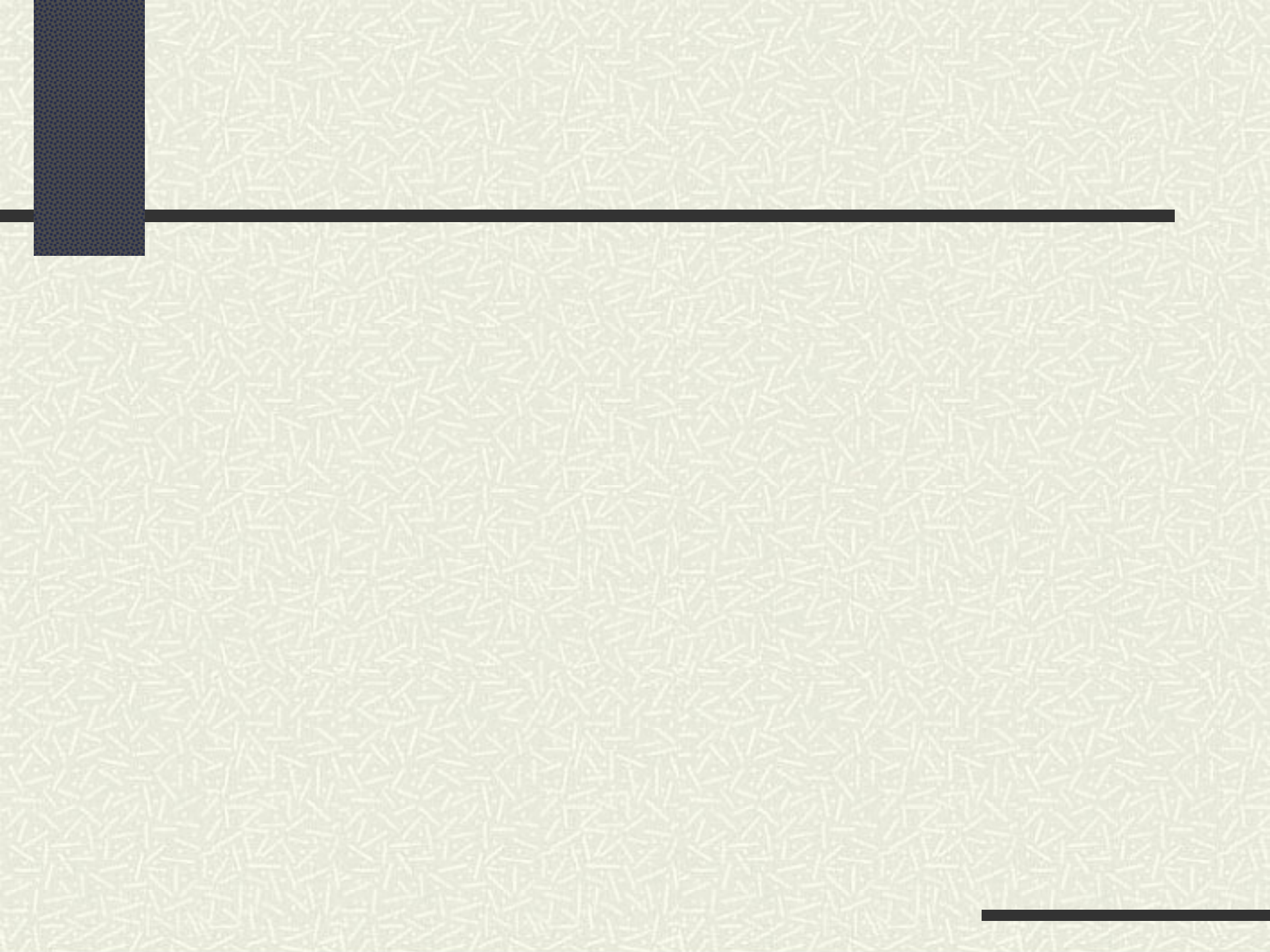
Dose to effect

“Give until it helps”

Respond to individual needs

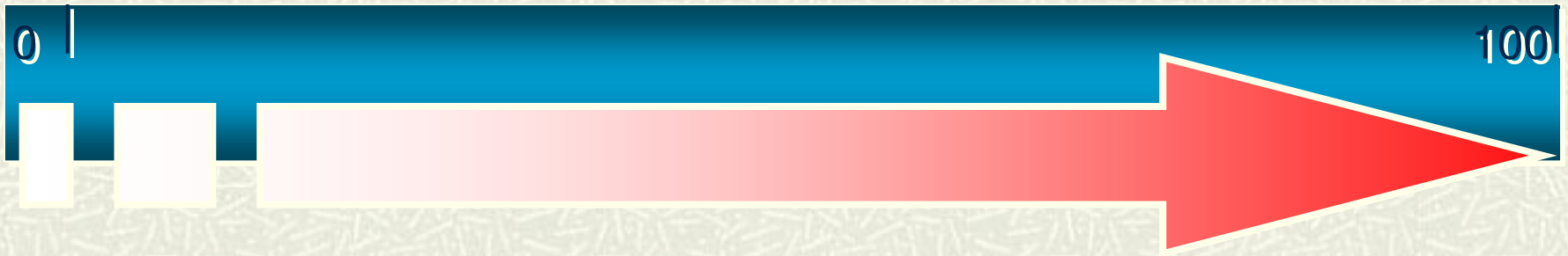






Pain Scales: Visual Analog Scale (VAS)

- Use of the VAS to evaluate pain management
Scale of no pain to worst pain ever, 0-100 mm



Pain Scales: Visual Analog Scale (VAS)



Animal with pain requiring treatment



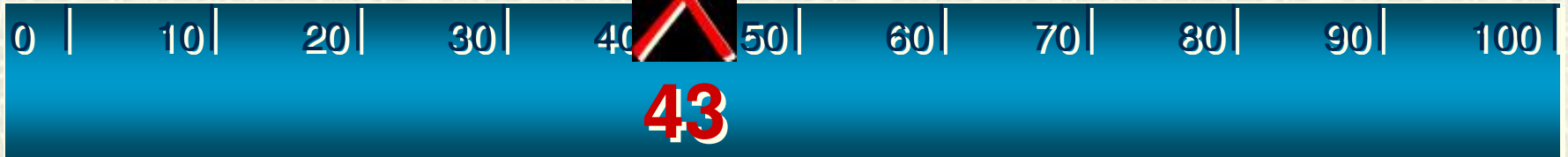
Pain Scales: Visual Analog Scale (VAS)



Evaluation after treatment

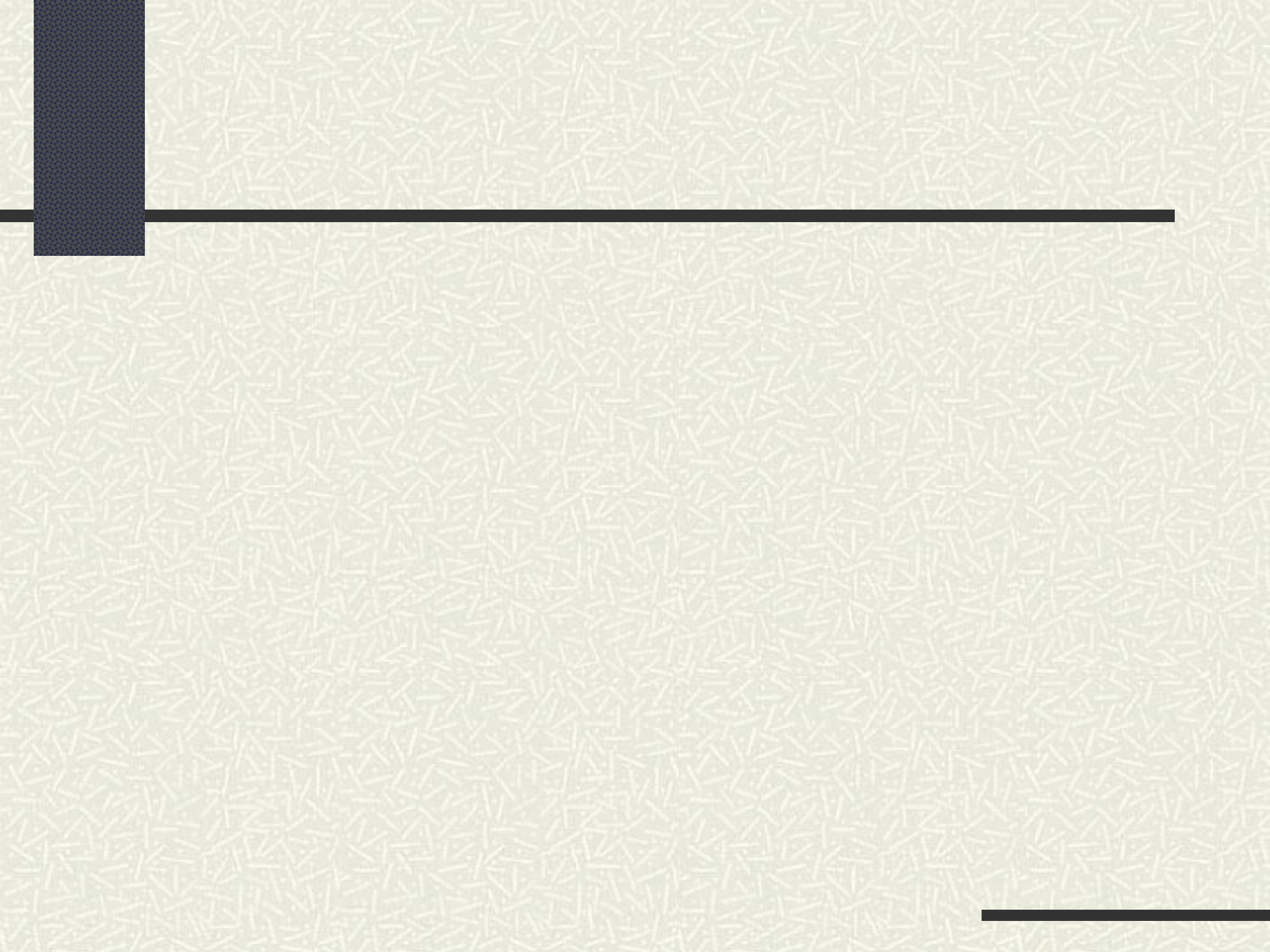


Pain Scales: Visual Analog Scale (VAS)



Post-treatment. Pain is returning, TIME TO REDOSE.





Epidural Analgesia in Cats:

- # More caudal cord termination and a smaller LS space than in dogs
- # Duramorph
 - Preservative-free morphine
 - 0.1 mg/kg
- # Marcaine
 - Bupivacaine
 - (q.s. 0.2 ml/kg)
 - “selective block”
 - augments opioid



Quantifying effectiveness of analgesics by use of force plate analysis:



Figure 1—Photograph of a cat standing on a pressure-sensitive mat for measurement of force applied by the forelimbs.

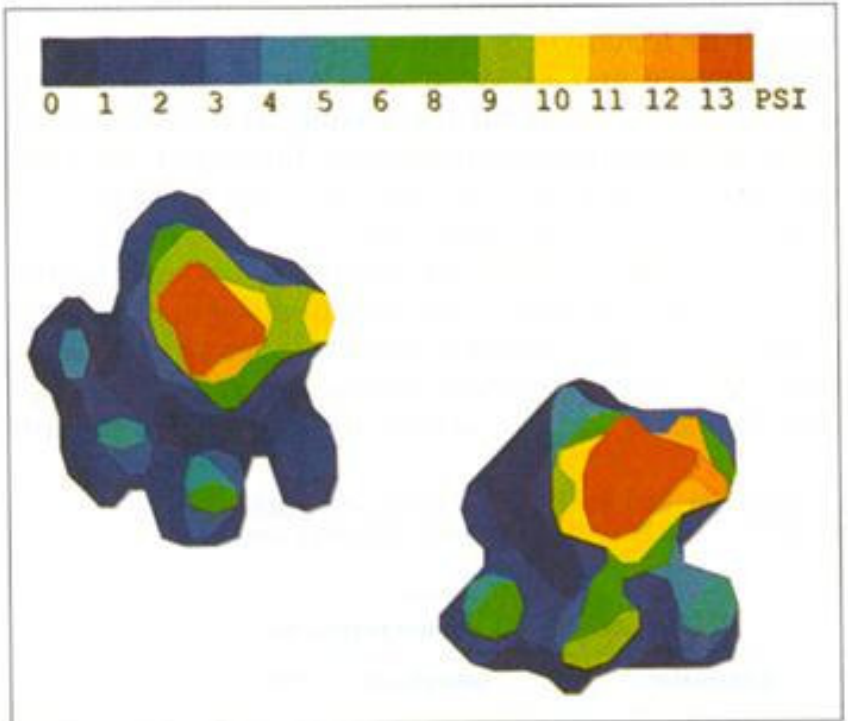


Figure 2—Output of the pressure-sensitive mat used for measuring force applied by the forelimbs in a cat (force is measured in pounds per square inch).

Eval transderm fentanyl...onchectomy. J. Franks, et.al, JAVMA, 217, 1013, 2000.



0.1-0.3 ml Bupivacaine (0.5%) at each site

(Total volume of bupivacaine \leq 0.4 ml/kg or 0.2 ml/lb max.)

Note: Never use locals containing epinephrine for any extremities!

(e.g. Septocaine or lidocaine with epi. = Risking loss of foot!)

Median nerve

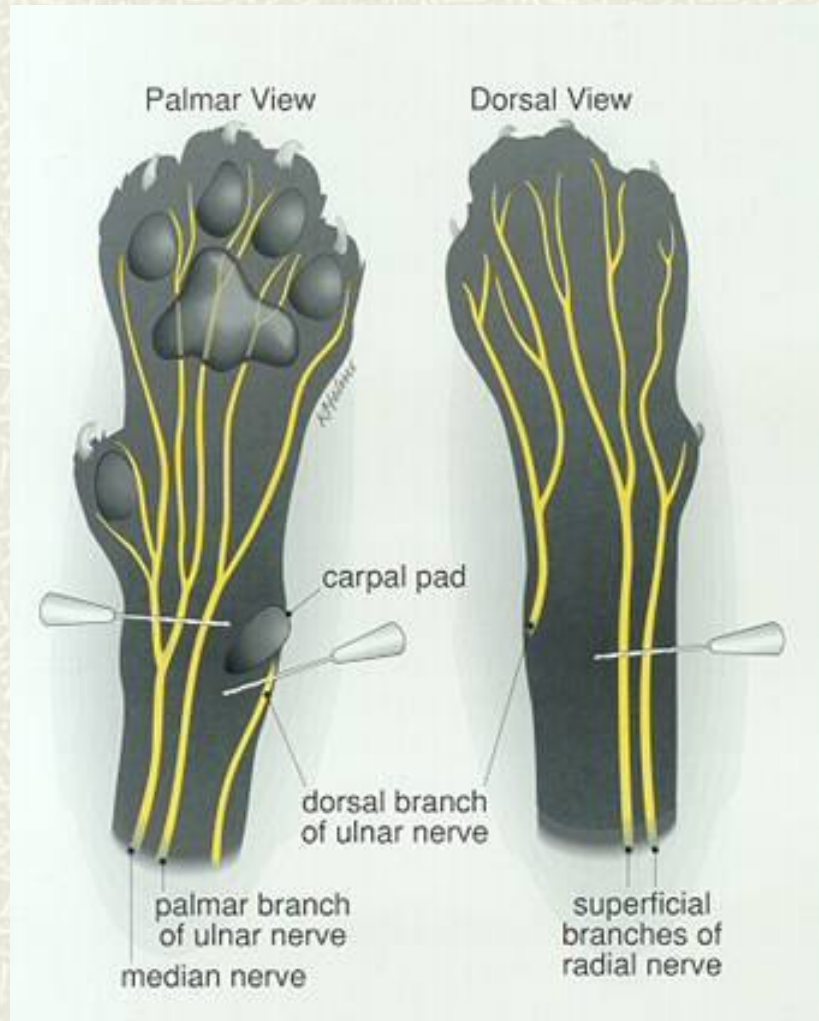
Ulnar nerve

- Palmar branch
- Dorsal branch

Radial nerve

- Superficial branches

“Ring block” at carpus serves the same purpose





Median nerve

Ulnar nerve

Dorsal branch

Palmar branch



Radial nerve

Superficial branches

Previously used techniques, such as this “field”
block or a “splash block” are less effective



Techniques influence outcome

laser surgical declaw -



Less tissue trauma

decreased need for heavy
and bothersome bandages

a more rapid and pleasant
recovery in many cats

Duragesic patch (fentanyl)



Strictly “extra-label”
recognize limitations and precautions

Incorrect placement of the Duragesic patch is a common problem:



Skin movement in this site (low on the neck and over the shoulders), and the tape covering, both served to loosen and remove this patch.

Incorrect placement is both wasteful and ineffective



Adverse effects occasionally seen: excitement, dysphoria, ptyalism

Remove the patch - Go to "Plan B"

Lots of options...



This Duragesic patch was a component of the analgesic plan for body wall resection for VA-FSA.

Duragesic Patches for Cats

Proper placement of patch:

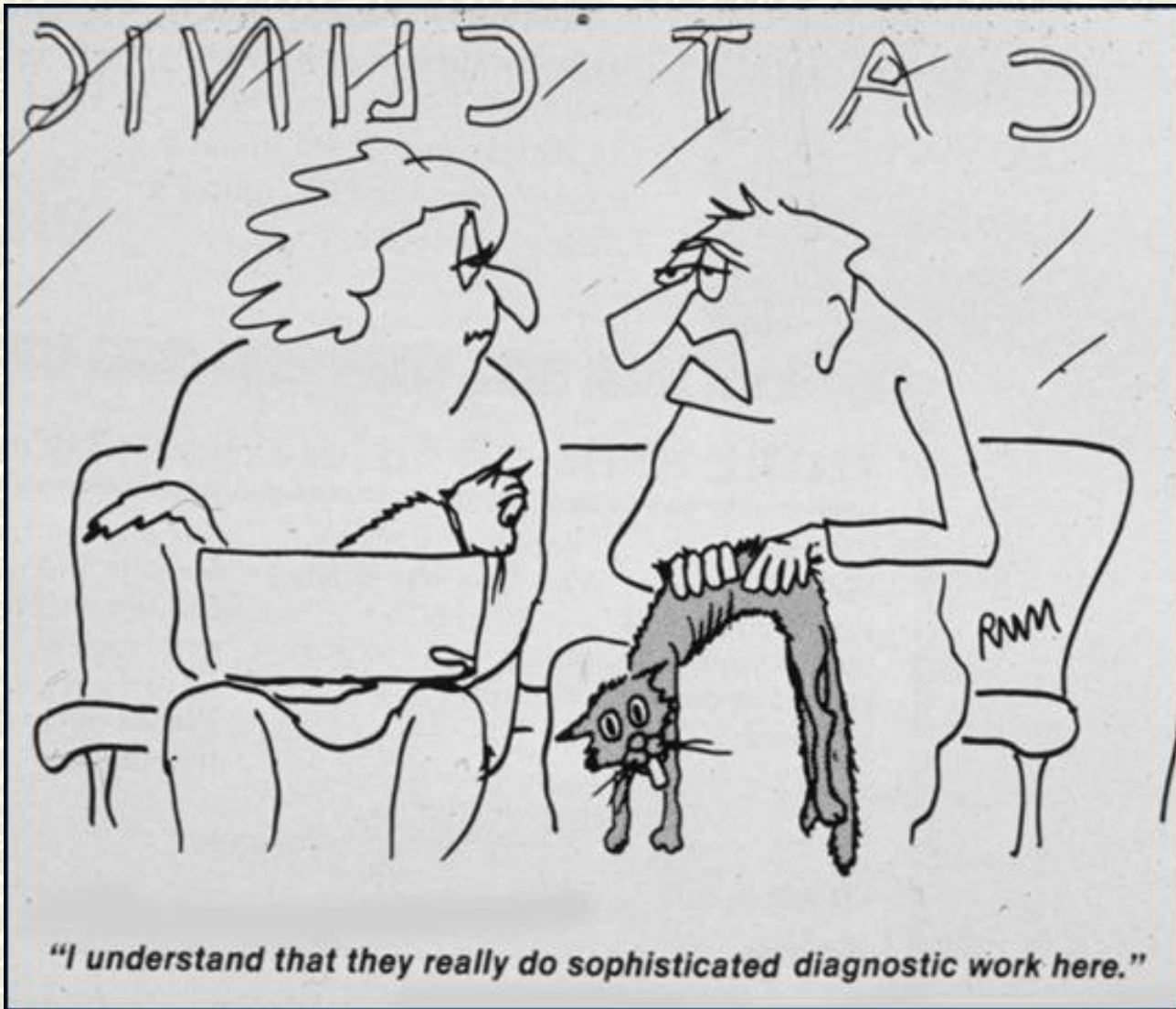
choices of site: dorsal neck, plantar metatarsus

preparation of skin



For smaller cats, fold the patch or retain some of the protective backing layer

Never cut the patch



"I understand that they really do sophisticated diagnostic work here."



