

# Anesthetic Workup & Utilizing NT-proBNP for the General Practice Dental Patient

presented by Clinician's Brief



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## Summary

In August of 2021 Jen Mathis DVM, CVJ, cVMA, CVPP along with Clinician's Brief discussed the benefits of anesthetic dental procedures as well as the preanesthetic process for dental patients, with the goal of improving patient outcomes and client communication. Below is the outline of the webinar presentation.

## Making the Case for Toothanasia

### Dogs 80% and Cats 70%

- Visually estimated prevalence of dental disease
- (Marshall 2014 - cite of a 1980s study)

### Dogs & Cats: 90%

- Better ways to find, but still a hidden disease
- (Fernandez 2012)

Under Diagnosed- most common and most under diagnosed disease in practice

Same Pain in Pets and People- yet they don't show it

### 41.7% Unaffected Teeth

- Provide essential or additional findings beyond exams
- (Verstraete June 1998 AJVR: Diagnostic value of full mouth radiography in dogs: 72.6%)
- (Verstraete June 1998 AJVR: Diagnostic value of full mouth radiography in cats: 86.1%)

69-100% of Cats Age 10+ have radiographic signs of tooth resorption

Only 19-20% On Exam of the same groups had visual evidence on awake oral exams

Substantial Numbers Missed when rely only on oral exam

## Impact of Dental Disease

- Association of PD and biologic lesions in multiple organs (DeBowes JVD 1996)
- Systemic effects of chronically infected oral cavity of dog (Pavlica JVD 2005)
- Periodontal disease burden and pathological changes in the organs of dogs (Pavlica JVD 2008)
- Association of periodontal disease with systemic health indices in dogs (Rawlinson JAVMA 2011)

## Liver Impact of Dental Disease

- Oral bacterial invasion increases liver parenchymal inflammation and portal fibrosis (DeBowes JVD 1996)

- Periodontal disease burden and increased inflammation in hepatic parenchyma (Pavlica JVD 2008)
- Generalized bacteremia (oral origin?) causes cholestasis in dogs (Taboada & Meyer JVIM 1989, Center 1990)

## Possible Heart Impact

- Mitral valve endocarditis after dental prophylaxis in a dog (Tou 2005)
- Echocardiographic alterations and PD in dogs: a clinical study (Boutoille 2006)
- Increases in AV valve changes noted with PD (Pavlica JVD 2008)
- 6-fold higher risk for endocarditis with stage 3 perio vs unaffected (Glickman JAVMA 2009)
- Common canine infectious endocarditis pathogen is identical to Enterococcus spp. of oral cavity (Semedo-Lemsaddek PLoS One 2016)

## Kidney Impact of Dental Disease

- Periodontal diseases are a risk factor for CKD development (O'Neill 2013, Finch 2016)
- As PD scores increased, CKD and cystitis incidence increased (Trevejo JAVMA 2018)
- Proposed relation to chronic inflammation and secondary kidney scarring resulting in decreased function over time (DeBowes JVD 1996, Pavlica JVD 2008)
- Creatinine and C reactive protein decreased after PD therapy (Rawlinson JAVMA 2011)

## Tumor Relation or Oral Disease?

- Numerous human studies show an increased incidence of oral cancer in patients with periodontal disease
- Suspect related to PD induced chronic inflammatory state
- Unknown if can extrapolate longevity from humans to animals.
- (WSAVA; JSAP July 2020) [bit.ly/wsavadent2020](https://bit.ly/wsavadent2020)
- Oral Nasal Fistula
- Perio-Endo Lesion

- Pathologic (Mandibular) FX
- Eye issues & blindness
- Increased oral cancers
- Osteomyelitis
- Osteonecrosis

Accident 4 yrs ago required enucleation; Socket filled with pus in 24 hours

Flip the Lip, Not Enough Alone tartar, gum margin? Parulis... (Clin Brief Stepaniuk 2014)

## General Anesthesia is Necessary

- A true, full exam can be performed
- Intraoral Radiographs
- Appropriate Treatment
- None of the above without anesthesia
- Without Anesthesia = stressful, false sense of security
- [afd.avdc.org](http://afd.avdc.org)
- [Bit.ly/AVMAdentistry](https://bit.ly/AVMAdentistry)

## OraStripDx.com

- Test for Bone Loss around teeth!
- Flipping the Lip Won't do the Trick
- Dogs:
  - 53% Ages 1-2
  - 87% Ages 3+

A dental cleaning without X-rays is missing 2/3 of each tooth. All teeth can be saved, (but some in a jar)

## Fear of Anesthesia

- Horror stories of the past are not usually reality
- Anesthetic Death Risk: (JAVMA Matthews 2017)
  - Dogs- 0.05%
  - Cats- 0.11%
- Extrapolated to Dentistry- 1 in 5,000
- Low Death Risk? Consider the whole patient
  - Age is not a Disease

Status	Definition	Risk	Examples
ASA 1	A normal healthy patient	Minimal risk	Ovariohysterectomy, castrate, orthopaedic patient
ASA 2	A patient with mild systemic disease	Slight risk	Neonate or geriatric. Controlled diabetic
ASA 3	A patient with obvious systemic disease	Moderate risk	Anaemia, low grade cardiac disease, dehydration, liver disease
ASA 4	A patient with severe systemic disease that is a constant threat to life	High risk	Shock, uncontrolled diabetes, emaciation, high fever, uncompensated heart disease
ASA 5	A patient not expected to survive without the operation	Extreme risk	Severe trauma, profound shock, advanced heart disease

- Lower ASA; Lower Risk
- Elective procedures are usually lower ASA
- Dentistry procedures are elective

## 7 Studies- 4.5 Million Pets

- Patients with Higher ASAs had higher death risk
- Higher ASAs are associated with nonelective procedures
  - (JAVMA Matthews 2017) (Vet Anaesth Analg Gil 2013) (Vet Anaesth Analg Bille 2012)
- A patient undergoing an elective procedure was 5-90 times likely to die during/after anesthesia
  - (JAVMA Matthews 2017)
- A cat is more likely to die following sedation than general anesthesia
  - (JAVMA Matthews 2017)
- Underweight dogs had a 15 times greater risk of anesthetic death, but the smallest breeds were not the most likely to die
  - (JAVMA Matthews 2017) (JAVMA Brodbelt 2008)
- When heart rate only was monitored (vs. not) the death rate post anesthesia was lower.
  - Use monitoring equipment, but team still needs to pay attention
  - Monitor trends
- Increased risk was seen without the use of premeds, IV induction, and gas anesthesia
  - Use premeds, IV induction, IV fluids, and gas anesthesia

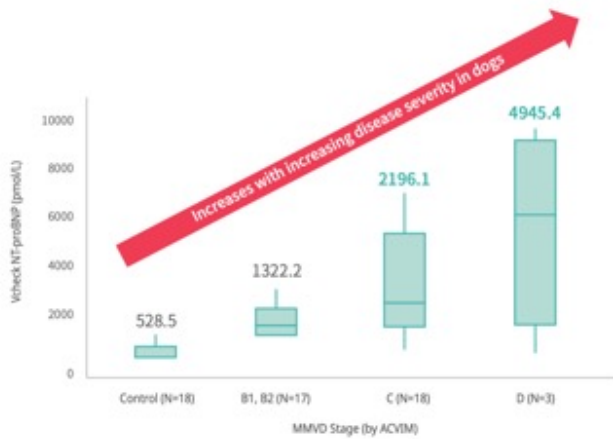
- (JAVMA Brodbelt 2008)
- Opioid administration was associated with a decreased risk of death following anesthesia
  - (Vet Anaesth Analg Gil 2013)
- No Anesthesia certainty, but patients with regular dental procedures: 20% greater longevity
  - (JAAHA Urfer 2019)
- Decide ASA, premedication/pain management plan
  - Consider the Whole Patient
  - Age is not a disease

## N-Terminal Pro-Brain Natriuretic Peptide

- Provides a number to assess the severity and possible prognosis of heart failure
- 'Chair-side' - answers in minutes;
  - Reduces decision time, faster to treatment
- Cost effective (\$12/test office cost)
- Decreases need for unwarranted ECGs and/or echos

## Quantifiable NT-proBNP

- 1 in 7 cats has asymptomatic HCM
- 65% of dogs will have MMVD by age 9 and 90% by age 13
- A normal result is a 94% chance of being normal or mild heart disease - even with a murmur; can differentiate physiologic murmur vs heart disease
- cBNP > 1800 = 5.4 times more likely to die from heart disease



	Control	Stage B1, B2	Stage C	Stage D
ACVIM Stage	Control	Asymptomatic (-/+ Left heart volume increased)	CHF signals	Terminal stage

- Stage C and medication: can see cBNP decrease with response to medication; good monitoring tool

## Other Considerations

- Less NT-proBNP is excreted with renal dysfunction (possible false elevation)
- Pathologic hypertension can also have elevated NT-proBNP
  - An elevated BP due to 'white coat' syndrome will not change NT-proBNP
- Pulmonary hypertension puts excess pressure on the heart: BNP can be elevated without primary heart disease, an echo can help diagnose pulmonary hypertension
- NT-proBNP testing can increase the diagnostic accuracy of Holter testing with DCM in Dobermans

## Screen for Heart Changes

- Just as you would screen other organs with a blood panel

## Communicate, Communicate, Communicate

- 1st call: pre-op sedation; report labs and BNP results
- 2nd call: update on treatment plan (after imaging)
- 3rd call: patient in recovery, set discharge time
- At Discharge: Review case (IMAGES) and Home Care

## Reduce Objections; Discuss Concerns

- Ease concerns with communication
- Discuss anesthesia
- Cost Concerns

## Teamwork

- Involve the entire team
  - CSR, Assistant, Tech, etc...
- Everyone needs to be on board
- Inevitably clients are going to ask the ERA for the low-down
- When possible touch the pet with the owner watching
- Be a patient advocate!
- National average of compliance?

## Likelihood of a Dental Problem on a Future Dental Procedure

(Buckley, British Journal of Nutrition (Jan 2011), 106, S124-S127)

	With Daily Home Care	No Home Care
Dog	16-19%	44%
Cat	10-14%	37%

## Likelihood of Bone Loss When No Home Care

(Marshall, BMC Veterinary Research 2014, 10:166)

No Home Care	Bone Loss
35, 20lb Dogs Age range 1-7 years	60 weeks
Every year older	5.5 weeks sooner

## Periodontal Disease is Preventable

- Every patient needs an annual anesthetic dental procedure with imaging
- NT-proBNP is a great screening tool for your pre-anesthetic work up