How to Champion Research and Education in Canine Inherited Disorders: A Model Approach

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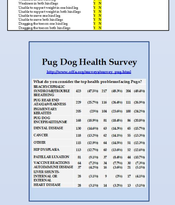
INTRODUCTION

Study of inherited disorders in companion animals, with emphasis in scientific clinical investigations and CE for veterinarians, is an AVMA policy. In some cases, detailed characterization of breed specific inherited disorders, and consensus statements for diagnosis, therapy, and prevention are not available. Many disorders may be perpetuated by the current breed conformation standards. Either there is not a validated program of health certifications to guide breeders in bloodline selection, or the relationship between desirable conformation and related disorders is not recognized. A program that successfully spread awareness and stimulated clinical studies on Pug Myelopathy is described here. A veterinarian with an interest in a specific disorder organized a broad-based effort to promote the study of this condition, as no clinical study had addressed the problem to date. Background information was gathered through literature searches, the new AVMA Animal Health Studies Database, the OFA, the AKC Canine Health Foundation, and other resources. Contacts were established with the AKC parent breed club, breed experienced veterinarians and specialists, breed rescue organizations, and other stakeholders. Owners of affected dogs were located through social media, and were encouraged to spread awareness and seek qualified veterinary care. The interest of a faculty member at MSU CVM was piqued enough so that a small grant proposal was written, and funding was ultimately obtained, and later supplemented by the national breed club. Affected dogs were recruited for enrollment in a clinical study to characterize the disorder, and ultimately suggest schemes to reduce prevalence. Owners were assisted by support groups, via telehealth, which suggested long term nursing care options. Initiating an advocacy group supporting focused scientific interest and CE regarding a specific companion animal inherited disorder enhances the health and welfare of the breed. By identifying common goals supported by all stakeholders, research and education are advanced.

GATHER RESOURCES

- Published Literature Search
- Breed Club Health Information
- Google Search of Breed Websites and Facebook (Rescues, Admirers, Breeders)
- Veterinary Information Network
- Case Reports from owners of affected dogs
- Develop questionnaire for owners of affected dogs
- OFA Recommended CHIC tests, Breed Health Certification results
- OFA PDCA Health Survey
- PDCA AKC Breed Standard
- Other rule out disease data (Degenerative Myelopathy)
- Global Veterinary Information

"POOL THE KNOWLEDGE"



Pug Dog Health Survey

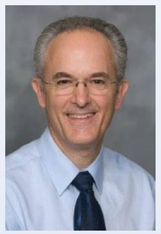
Degenerative Myelopathy DNA test results

These two Pugs are identical, but the black color gives the optical illusion of four bone, less substance and smaller size.

BVA and BSAVA statement on brachycephalic breeds

Following recent calls urging veterinary surgeons and their professional associations to take action to address the health problems experienced by brachycephalic dog and cat breeds, the British Veterinary Association (BVA) and the British Small Animal Veterinary Association (BSAVA) have issued the following statement:

STIMULATE RESEARCH



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Investigation of Causes of Hind Limb Ataxia and Weakness in Pug Dogs

Study participants:
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3. Kathryn Winger, DVM, Dipl ACVIM (Neurology); Dept. of Small Animal Clinical Sciences
4. Joshua Gehrke, DVM, Dipl ACVIM (Neurology); Dept. of Small Animal Clinical Sciences
5. Anthony Pease, DVM, Dipl ACVR; Dept. of Small Animal Clinical Sciences
6. Nathan Nelson, DVM, Dipl ACVR; Dept. of Small Animal Clinical Sciences
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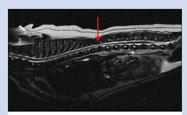
8. Sarvenaz Bagheri, BS; MSU DVM student, Class of 2018
9. Michael Kluz, BS; MSU DVM student, Class of 2018

Funded by Pug Dog Club of America

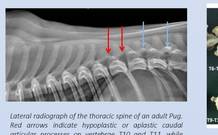
MICHIGAN STATE UNIVERSITY | College of Veterinary Medicine

INDEX CASE

The term "Pug Myelopathy" refers to a complex of spinal cord conditions that usually includes both bony (vertebral) and spinal cord abnormalities. The pathogenetic relations of the various conditions is unclear. Almost all Pugs have underdeveloped (hypoplastic) or absent (aplastic) vertebral articulations to some degree between T11 and L1. Spinal cord lesions have included one or multiple sites of chronic Hansen type II intervertebral disc disease (IVDD); spinal arachnoid diverticulum (SAD); spinal cord atrophy; and fibrosis of the arachnoid layer of the meninges. Dural/arachnoid fibrosis has been described as a component of the condition called "constrictive myelopathy" (CM). Unraveling the relationships between these conditions is one goal of the study at Michigan State University.

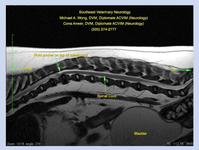


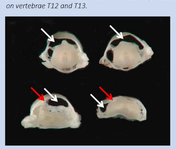
MRI, with contrast, lateral plane, of the spinal cord of the 6-year-old, spayed female Pug of the index case. The red arrow indicates spinal cord compression at T12-T13.



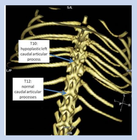
Lateral radiograph of the thoracic spine of an adult Pug. Red arrows indicate hypoplastic or aplastic caudal articular processes on vertebrae T10 and T11, while blue arrows indicate normal caudal articular processes on vertebrae T12 and T13.

Dorsal and caudal views of thoracic vertebrae T9-T13 from a 6-year-old Pug (not the Pug of this report). Arrows point to small (hypoplastic) or absent (aplastic) left caudal articular processes.

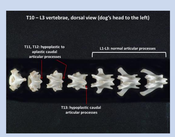




Formalin-fixed spinal cord, transverse sections: TOP ROW, left to right: T8-T9, T9-T10; BOTTOM ROW, left to right: T10-T11, T11-T12; marked dilation of subarachnoid space in all sections (white arrows), with grossly apparent arachnoid fibrosis (red arrows) in 2 sections. SAD case.

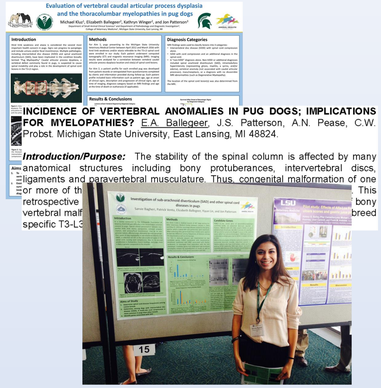


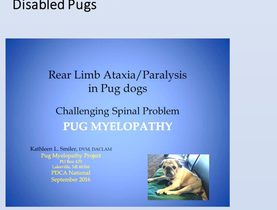
A 3D CT reconstruction of the vertebral column of an adult Pug. Hypoplastic left caudal articular process on the T10 vertebra.



PROFESSIONAL AND SOCIAL OUTREACH

- Successfully enrolled 40 + pure-bred Pugs all affected with neurological deficit localized at T3-L3 for MRI/CT and necropsy (at demise) in 2 years
- Presentation of preliminary data
- AVMA Animal Health Clinical Studies Database utilized
- State VMAs, Veterinary Specialists, and Academic Veterinary Neurology Departments were updated
- The Pug Dog Club of America (PDCA) published project progress reports for members
- Attended the PDCA National Specialty 3 years with information, DNA collection clinic, and presentations
- Attended Rescue Events with information and presentations
- Established Website pugrearataxiaparalysis.com
- Established FaceBook Page Pug Dog Health – Rear Ataxia/Paralysis
- Support Lay Groups with Disabled Pugs





AVMA AAHSD

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AVMA Animal Health Studies Database

Welcome to the AVMA Animal Health Studies Database (AAHSD)! Veterinary clinical studies conducted to investigate novel therapies or to collect samples or information to gain further understanding of a disease provide the best scientific evidence to guide the clinical care of animals, and oftentimes, people too.

Study Details	Project Description
AAHSD000312 **Investigator:** **Jon Patterson** **Location(s):** **Michigan State University–East Lansing, Michigan** **Recruitment Status:** Recruiting **Interested in Participating in the study?** **Study Contact:** Kathleen Smiler smilerk@mindspring.com 1-248-953-3182	**Investigation of Causes of Hind Limb Ataxia and Weakness in Pug Dogs** Purebred Pug dogs with symptoms of hind limb weakness and ataxia will be evaluated by board-certified neurologists for potential enrollment in the study. The dogs will receive a physical and neurologic examination, and are eligible for enrollment if a neurologic deficit is localized to the T3-L3 spinal cord. Enrolled dogs will receive pre-anesthesia bloodwork screening, and advanced diagnostic imaging (CT and MRI) under anesthesia. Buccal swabs will be collected and tested by the University of Missouri Animal Molecular Genetics Laboratory for genetic predisposition to Degenerative Myelopathy. Owners will provide periodic updates on their dog's condition through telephone consultation and/or re-examination, and postmortem examination (necropsy) will be performed by a board-certified pathologist at the end of the dog's natural life or after euthanasia.

pugrearataxiaparalysis.com

GOALS AND STAKEHOLDERS

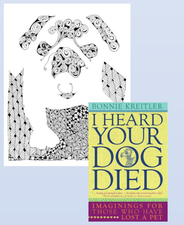
Goals

- Initiate other areas of research regarding care
  - Surgical techniques
  - Medical management
  - Palliative therapy
  - Physical therapy
  - Integrative medicine
  - Regenerative medicine including stem cells Genetics and valid health certification procedure utilizing radiology?
- ACVIM Consensus Statement on Pug Myelopathy

Stakeholders

- Veterinarians and Specialists
- Breed Club/AKC
- Ethical breeders
- Rescue organizations
- Owners of companion animals
- Large scale pure-bred commercial operations

Wheelie Pugs on Facebook



Lily inspired a book by Bonnie Kreitler

New AVMA policy encourages research, CE, and outreach on inherited disorders in companion animals

Inherited Disorders in Responsible Breeding of Companion Animals

To maximize the health and welfare of companion animals, the AVMA supports research in genetic and inherited disorders to better educate the profession and breeders on identifying and minimizing inherited disorders in companion animal breeding programs. To assist with this, the AVMA encourages veterinarians to pursue continuing education in the emerging area of genetic disease in companion animals. The AVMA also encourages veterinarians to educate breeders, companion animal owners, and the public on the responsibilities involved with breeding and selecting companion animals

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