



# PURINA Pro Club

## *Bulldog Update*

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### Tracheal Hypoplasia Requires Proper Management

**G**urgly breathing and constant coughing were the first signs of a possible health problem that new Bulldog owner Denise Gaines noticed in her 17-week-old Bulldog puppy, "Jezabull."

"At night Jezabull would constantly cough," says Gaines of West Columbia, Texas. "It sounded like she had a lot of phlegm that she needed to get out. I started massaging her back and sides to try and loosen it."

When the puppy began sitting up holding her head straight in the air gasping for air, Gaines knew she needed to find out what the problem was. "The veterinarian explained that Jez's trachea was about the size of a straw," she says. "She told me that Jez might only live three years or at most six years."

Jezabell suffers from tracheal hypoplasia, a congenital condition first diagnosed in 1972 that results from inadequate growth of tracheal cartilage rings. Hypoplasia means underdeveloped or smaller than normal. In dogs suffering from trachea hypoplasia, the windpipe is often less than two times the width of the third rib where they cross.

Radiographs, or X-rays, are used to diagnosis the condition. Usually radiographs are taken when an animal isn't showing signs as other conditions can mimic tracheal hypoplasia. Other congenital abnormalities associated with tracheal hypoplasia include

elongated soft palate, certain cardiac defects, megaesophagus (enlarged esophagus), and stenotic nares (small nasal passageways).

Clinical signs of tracheal hypoplasia vary depending on the severity and

whether other conditions are present. An otherwise healthy dog with a mild to moderately narrowed trachea may not display any clinical signs. Common signs are dyspnea (difficulty breathing),

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#### BCA Funds Tracheal Hypoplasia Pilot Study

**A** pilot study, funded by the Bulldog Club of America in conjunction with the Orthopedic Foundation for Animals, is currently under way to define a normal tracheal diameter in Bulldogs. About 35 Bulldogs have been studied, but researchers hope to include 100 dogs in the study.

Greg Keller, D.V.M., MS, DACVR, chief of veterinary services for OFA, says, "There is some speculation that the trachea may change with age, so we are considering expanding the study to follow dogs throughout the first year of life. At this point, we are not certain that Bulldogs are more affected than other brachycephalic breeds, but obviously the parent club is concerned. This has prompted our study."

Keller is evaluating three radiographic measurement methods used to estimate tracheal diameter. These are:

- Relative diameter versus the inside diameter of the larynx;
- Using tracheal diameter to the width of the thoracic inlet; and
- Using diameter of the proximal third rib to establish tracheal diameter ratio.

Keller suspects that the third method, using the diameter of the proximal third rib to establish tracheal diameter ratio, may provide the most consistent measurement.

To continue the research, Keller and his research team are seeking chest radiographs from Bulldogs to add to their database. For information about participating in the study, please contact the Orthopedic Foundation for Animals at [ofa@offa.org](mailto:ofa@offa.org) or (573) 442-0418. An application with instructions for veterinarians can be found at <http://www.offa.org/trachhypoappbw.pdf>.

The Bulldog Club of America is offering reimbursement to help cover the cost of radiographs for owners of the first 100 Bulldogs that participate in the study. For information, visit <http://bcahealth.homestead.com/files/tracheastudyregistrationform.pdf>.

### Researchers Aim to Better Understand Brain Tumors

**J**umping on the bed to snooze with owners Glory Harris and her husband, Mark, was commonplace for "Oliver," a 6-year-old brindle-and-white Bulldog. When Oliver appeared to have a stiff neck and could no longer jump up, they knew something was wrong.

The veterinarian initially suspected a pulled neck muscle, but when Oliver started having difficulty walking and eating, it was apparent there may be another problem. The veterinarian

thought perhaps Oliver had a brain tumor and referred the Harrises to a veterinary neurologist. After extensive testing, it was confirmed that Oliver had an inoperable brain stem tumor.

Eventually Oliver started having cluster seizures, one right after the other. "The time came we had to let him go," says Glory Harris of Staten Island, N.Y. "It happened very quickly. From the onset of the stiff neck until Oliver died was two months."

"Madison," a red-brindle-and-white Bulldog, was also 6 years old when she was diagnosed with a brain tumor. The first sign was a grand mal seizure when she was 5. Her owners, Kristen and Russell Smith of Rockwall, Texas, took Madison to the veterinarian. After blood work and an examination, the veterinarian did not think epilepsy was the cause. They agreed to wait and see if there were more seizures.

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## Tracheal Hypoplasia

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coughing and stridor (high-pitched respiratory sounds). Veterinarians caution that dogs with tracheal hypoplasia are susceptible to aspiration pneumonia, a potentially life-threatening condition in which an animal inhales regurgitated mucus in the lungs.

Jeza Bull experienced aspiration pneumonia on more than one occasion. "Once Jez started throwing up a foamy mucous material, I knew it was time to rush her to the emergency room," she says. "They would place her in an oxygen tank and give her a sedative to calm down. Whenever Jez threw up, I knew it could cause her to aspirate and that could lead to pneumonia."

As a congenital condition, hypoplastic trachea is present from birth and thus can be diagnosed when dogs are young. The median age of diagnosis is 5 months of age. Though no evidence indicates the condition is hereditary, dogs affected with the condition should not be used for breeding. Bulldogs and other brachy-

cephalic breeds, such as Boston Terriers, are prone to tracheal hypoplasia. These breeds have short noses and muzzles, and their throat and breathing passages are often undersized or flattened, resulting in difficulty breathing.

The prognosis for affected dogs depends on the degree of hypoplasia and whether there are other congenital defects. Fortunately, as long as a dog isn't affected by other respiratory or cardiovascular diseases, tracheal hypoplasia generally can be well-managed. Among considerations is maintaining a dog in proper weight as obesity can strain the respiratory system. Affected dogs also should be housed in a draft-free environment to help prevent complications. In some instances, anti-inflammatory medications are prescribed for affected dogs.

Besides tracheal hypoplasia, Jeza Bull suffers from other brachycephalic conditions that have complicated her care. Despite the challenges, Gaines is pleased that Jez has defied the odds given her by the veterinarian who surmised she would not live more than six years. Jeza Bull turned 7 years old this year.

"The first two years were the worst," Gaines says. "We honestly did not know whether she was going to live or die. I spent many sleepless nights holding her head up to help her breathe, and there were tons of midnight drives to the emergency room to get her into the oxygen tank."

Like other owners of Bulldogs affected with tracheal hypoplasia, Gaines and her husband believe in doing all they can for their beloved dog. "During one of Jez's worst trips to the emergency room, the veterinarian asked me how far we were willing to go to save her," recalls Gaines. "I called my husband and told him her condition. I let him know they had asked how far we were willing to go. He said it all when he replied, 'To the moon.'" ■

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## Brain Tumors

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Two months later, Madison had two more grand mal seizures, and the Smiths were referred to specialists at Texas A&M University College of Veterinary Medicine, who found a small mass in the center of her brain. "They thought it might have been an anomaly like fatty deposits in the brain since Madison did not have other signs of brain tumors," says Kristen Smith.

Madison's condition began to worsen. She began having cluster seizures and body tremors in her upper body. Her personality had begun to change as well. The specialists re-evaluated Madison's computed tomography scan and her condition. They agreed it was a brain tumor.

Seizures like those experienced by Oliver and Madison can be a sign of a brain tumor. Bulldogs are among the brachycephalic breeds believed to have a high incidence of brain tumors, say investigators studying new treatment techniques for canine brain tumors.

Brachycephalic breeds may be at risk due to inherited mutations linked to their breed phenotype, says John Robertson, V.M.D., Ph.D., professor of veterinary and comparative pathology at the Virginia-Maryland College of Veterinary Medicine.

Primary brain tumors, those that grow from cell mutations in the brain or spinal cord versus those that have spread from cancer elsewhere in the body, or tumor metastases, occur in dogs and humans. These tumors are three times more common in dogs, and more than 70 percent of primary tumors are diagnosed in dogs age 6 or older.

## Comparative Research Approach

Ongoing collaborative research among human and canine investigators is focusing on the causes of canine brain tumors and the possibility of improved treatment using novel human therapies. The research, funded by a Wake Forest University Translational Science Institute grant, involves 25 veterinarians, physicians and scientists at Wake Forest University School of Medicine in Winston-Salem, N.C., and Virginia Tech in Blacksburg, Va.

Robertson, project coordinator, says three breeds — Bulldogs, Boxers and Boston Terriers — are part of the research that has been under way for four years.

The researchers aim to document statistical incidence, breed-related risk factors, disease progression and prognosis of specific types of brain tumors. They also plan to biopsy tumors to confirm tumor type and help determine the most effective treatment for an individual dog.

As the dog genome is quite similar to the human genome, the investigators are optimistic that genetic discoveries could benefit both humans and dogs. "We are looking to identify the presence of molecular markers that have already been identified in human tumors," says Waldemar Debinski, M.D., Ph.D., co-principal investigator and director of the Wake Forest University Brain Tumor Center of Excellence.

"We will compare DNA from highly susceptible breeds to those with low-incidence rates and to breeds that develop other forms of cancer," says Debinski. "We place a lot of hope in new experimental human therapies that are coming in the next decade.

We believe because of the molecular similarities, we will have similar success in treating dogs."

Two novel therapies first used in humans are being studied. Gamma-ray therapy provides an alternative to neurosurgery using multiple beams of gamma radiation to successfully destroy brain tumors. Beams of radiation focus on one target without exposing and subsequently harming surrounding tissue.

Unlike traditional radiation in which small doses of radiation are given daily over the course of several weeks, gamma-ray therapy gives one huge shot of radiation at once. With this method, radiation is delivered with pinpoint accuracy.

Recombinant cytotoxins provide a second novel treatment option. "This involves using modified cellular toxins specifically targeted at brain tumor cells," explains Debinski. "We have identified several molecular targets and several cytotoxins that will kill cancer cells at very low concentrations."

An innovative technique, called convection enhanced delivery (CED), allows researchers to bathe the tumor cell cavity with cytotoxins once the tumor is removed. Unlike traditional chemotherapy or radiation following surgery, CED applies cytotoxins directly to the tumor site. Cytotoxins effectively kill any remaining cancer cells without harming normal tissue.

"We want to know if the same experimental treatments we're offering humans are verified in dogs," Debinski says. "Potentially, CED will prove to be a breakthrough treatment for invasive brain tumors." ■