



**BRACHYCEPHALIC  
OBSTRUCTIVE AIRWAY  
SYNDROME AND SURGERIES**

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**BOAS AND OUR UNIVERSITY  
VETERINARY EMERGENCY  
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**WHAT PATIENT OWNERS  
SAID AFTER BOAS  
SURGERIES?**

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THE



CAMPUS  
*we could be heroes!*



**I AM NOT  
SNORING  
I HAVE  
BOAS!**

**As The Campus,  
we are opening the  
brachycephalic  
breed problems,  
surgeries, and  
**emergency**  
conditions  
in this issue!**



# THE CAMPUS

*we could be heroes!*

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# THE TRUE HISTORY OF BRACHYCEPHALIC BREEDS

by Bryan Meguira

*On the internet, they are true stars. Their images are used for memes, phone's wallpapers, or even funny t-shirts. We all have seen the picture of an alien looked pug with eyes and tongue outside, and we even shared it, because it's cute.*

*Behind the scenes, this is a whole different story where, as usual, profit took over welfare, and animals are human taste's victims. Fortunately, veterinary doctors and veterinary technicians, together with well-meaning persons are fighting for those who have no voice... But their snore.*

*Welcome to the breathless world of Brachycephalic breeds.*

## Who are you, Brachycephalic breeds?

The word brachycephalic comes from Ancient Greek “brachus” (βραχύς), 'short' and “kephale” (κεφαλή), 'head', and describes the anatomical aspect of a skull shorter than typical for the species. This characteristic is often wanted for certain breed, making from this abnormality a quality for breeding standards. Monetizing the pain. This genetic manipulation has been exaggerated during the last century, leading to the aspects we know today. In this part, we are going to travel in time and explore the history of three of the most popular brachycephalic breeds: the pug, the English Bulldog and the French Bouledogue.

First of all, it is important to talk about general history. Even though dogs were domesticated around forty thousand years ago (more information about dog's domestication in “The Campus” issue 3-K9 article), they were most of the time used for their natural abilities, such as hunting, or herding, and for thousands of years, the concept of “breed” was almost totally absent.

Back then, dogs were classified by “types” and functions, and only a few variations could be observed. Once again when talking about genetic, the purebreds revolution started in Great Britain during the Victorian period (1837-1901), with the publication in 1859 of Charles Darwin's book 《On the Origin of Species by Means of Natural Selection》, or the 《Preservation of Favored Races in the Struggle for Life》. Darwin taught us that nature is always adapting to new conditions and opens the door of the artificial selection. In the same period, middle-class city dwellers started to regularly keep pets for themselves and their children, and the eugenic movement preached that they could breed “pure” and ideal animals and humans. In other words, the concept of purebred is “only” 150 years old.

A purebred dog is considered as so only if his whole family tree is recorded in a stud book and registered in the local kennel club. The aim of this tracking and breeding from the same pure line was to create healthier and better dogs. Unfortunately, this led to inbreeding: the anchoring of unwanted recessive genes in the genetic code of the breed. In other words: we kept focusing on the desirable traits, while the unwanted ones were peacefully colonizing the breed DNA. For example, according to a 2017 survey made by The American Pet Insurer Nationwide shows that Brachycephalic breeds face a more than 100% increase in the likelihood of claims for corneal ulcers and ocular trauma, 80% increase for cancer and fungal skin disease, 100% for pneumonia and heart stroke.

Another example could be the curly tail of pugs, caused by a malformation called hemi-vertebrae which can have heavy consequences such as nerve damage, leading to pain or even paralysis.

Despite this, the kennel clubs' standards for Pugs mentions that the tail should be "curled as tightly as possible over hip, double curl highly desirable". The American Kennel Club (AKC) even described the double curl as "perfection".

Talking about Pugs, where do they come from?

## The History of Pug

The origin of Pug can be dated to approximately 400 B.C, in China, where the wealthy probably kept them as pets, as well as later when Tibetan Buddhist monks were keeping them in their monasteries. They were even venerated as Chinese emperors' dogs. Chinese breeders purposely aimed to create a pattern of wrinkles on the dogs' foreheads, because it looked like the Chinese character for "prince" (王). From China, pugs started to be popular in Japan, in Russia, and ultimately in Europe, where their small size led to the idea of a "comfortable" dog with minimal needs.

Russia was probably the main promoter of Pugs before their arrival to Europe, and Princess Provost Hedwig Sophie Augusta (1630-1680), the aunt of Catherine the Great of Russia was even reputed to have kept a score of Pugs and her dogs always accompanied her to church. Again in Russia, we can appreciate in the Pushkin Museum of Fine Arts, Moscow, a portrait of Princess Ekaterina Dmitrievna Golitsyna (1720-1761), with her pug. (Fig 1)



Fig 1- Princess Ekaterina Dmitrievna Golitsyna (1720-1761), with her pug, source: Pushkin Museum of Fine Arts.

But the influence of pugs can also be seen in other countries high society:

● The English painter William Hogarth (1697-1764) was a very passionate pug owner, and His 1745 self-portrait, which is now in London's Tate Gallery, includes his pug, Trump (fig 2)

Fig 2- William Hogarth and his pug Trump, 1745. Source: Wikipedia.com



● When the Catholic Church forbid Catholics from becoming Freemasons, catholic members decided to form a covert Freemason society called the Order of the Pug in 1740. To be initiated into the order, you had to wear a dog collar and scratch at the door. Unlike traditional Masonry, The order of the Pug allowed women to join.



Fig 3- The Order of the pug. In the middle is the symbol; source www.istockphoto.com

● Queen Victoria of England (1819-1901) had over 38 pugs in her life (fig 4).



Fig 4- Family group with Queen Victoria and a pug, Balmoral 1887  
source: [www.rct.uk](http://www.rct.uk)

● Or even as early as the XVI century, when the Prince of Orange, William The Silent of Holland (1533-1584) was saved by his dog Pompey. Back then, William was in a campaign against the Spanish, in Hermigny, France. He was sleeping in his tent when assassins penetrated in order to kill him. Pompey barked, scratched, and finally jumped on his master's head to warn him of the danger. In memory of this act, Pompey is represented at his owner's feet on the monument of William the Silent, at the Church of St. Ursula, in Delft, Holland (Fig 5).



Fig 5- Pompey is represented at his owner's feet on the monument of William the Silent, at the Church of St. Ursula, in Delft, Holland  
source: <https://dogs-in-history.blogspot.com/>

Why I showed these pictures? it's because I wanted you to pay attention to a detail. Did you? I will help you with a few other pictures.



Fig 6- Pug in 1802- source Quora.com



Fig 7- Miss Neish, member of the Ladies Kennel Club of England, 1898 source: official AKC website

You understood where I want to go and what I meant, right?



Fig 8- Pug nowadays, source puggingabout.com.



Fig 9- One of the innumerable pug's representations of the internet.  
Source <https://www.nicepng.com/>

The Tibetan monks' guardian, William the Silent's savior, the Chinese empire's idol, the Freemason revolution icon, has become an internet joke.

## The History of Bulldog

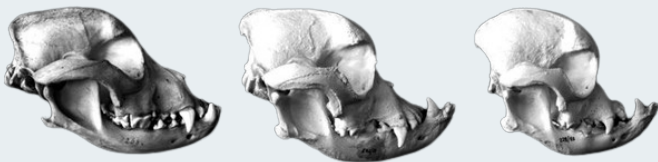


Fig 10- Evolution of the brachycephalic skull of the English bulldog over the 20th century. (source Marc Nussbaumer <https://commons.wikimedia.org/>)

Someone told me once that a picture is worth more than a thousand words. And the representation of the bulldog skull over the last century is definitely a great example for this sentence. Today's English bulldog is far, far away from his ancestors. It's the representation of the couch dog, for whom any movement looks like a waste of energy, and let's not talk about the summer period, when a five-minute walk looks like a marathon. However, it's name seems to indicate another truth, an untold story. The bulldog's history started in the XIII century, in England, when butchers were in need of some brave, strong, determined dogs in order to immobilize a cattle from a herd when shepherd dogs couldn't keep them in a line, or even wild boars, before slaughter. For such a skill, they needed a dog with a strong enough jaw to keep the bite when the bull tried to throw it in the air, a neck wide enough to resist such a pression, a low gravity center to pull cattle on the ground, and almost no sensitivity to pain.

In order to select dogs suitable for this job, the same butchers had invented a practice that became a popular sport between the XVII – XIX century, the cruel Bull Baiting.

In Bull Baiting, a bull was tethered by means of chain or rope, usually around 15 feet in length. The dogs were brought by their owners and released on the bull for a death or life fight. This sport, as well as dog fights, was made illegal by the Cruelty to Animals Act of 1835.



Fig 11- Tethered Bull source  
<http://www.wweba.com/WWEBA/history.html>

After the Bull Baiting's ban, the Bulldog started to be considered as useless by the population, and it was about to extinct, but breeders started to adapt them for a domesticated companion life, by keeping their unusual look, short muzzle and wrinkles, but taking them to a smaller size, trying to erase as well their natural aggressiveness, which was needed for the animals selected for dog's fight for example, replacing it by tenderness and loyalty to their owner.

Over the years, the English Bulldog won people's love, and became the symbol of a large scale of different entity, like the Churchill insurance, numerous Football team, or even the US Marine, making from the bulldog a deeply anchored icon in our culture, representative of strength, determination, ferocity.



Fig 12- US Marines unofficial patch with an English Bulldog source  
<https://www.devildogdepot.com/>

If he has been close to the idea that the urban legend built, today's bulldog is not the athlete he used to be, and like the pug, over selection of representative traits had made unwanted genes to pop up and to become characteristic of the breed it became today. From my opinion, the English Bulldog is the biggest representation of genetical flaw and human dependence: In 2010, over 80% of bulldog births required a caesarean section (source : Lignées, n° 3, septembre 2010 - SFC (Société Francophone de Cynotechnie)). In other words, without human intervention, the English Bulldog would probably disappear.

I will conclude this bulldog overview the same way I started it: with a few pictures that worth more than thousands of words:



Fig 13- Bulldog of the 1930's . Source: <http://www.wweba.com/>



Fig 14- Today's bulldog.. (Source: <https://www.canva.com/>)

At least, they are not a treat for any bulls, or any wild boars now.

The Bulldog also gave birth to several other breeds around the world: the American Bulldog in the USA, the Boxer in Germany, for example, and, in France, to the French Bouledogue.

## The History of French Bouledogue

Although his name can be confusing, the French bulldog is not originally from France! In fact, as we mentioned before, after the Law on animal cruelty, English breeders started to breed smaller and more adapted Bulldog strand, by crossing them with terriers, and pugs. Since the Britain market wasn't big enough, they wanted to extend their influence, and started to sell their breeding "flaws" abroad, especially to their French neighbour. And this is how a smaller bulldog, with standing ears, appeared in France. These traits, unlike in the UK, seduced the French society from the beginning, and the "Bouledogue Francais" became the fashion symbol of the Parisian life, from prostitutes, madams, and the social elite. The prostitutes used him as a way to start a conversation with their clients, always curious about these big eyes that give to the bouledogue his incomparable look, and, this is how these non-standard Bulldogs started to be commonly called French Bulldogs, French Bouledogues, Bouledogues Francais.



Fig 15- Colette and her Bouledogue, Toby Chien. Source: [thevelvetnap.wordpress.com](http://thevelvetnap.wordpress.com)

At the end of the XIXth century, the French bouledogue made its big return to the United Kingdom, where the Bulldog's breeders were not happy to see this UFO on their territory, fearing a crossing between them and the endemic English Bulldog. But the Frenchie notoriety took the advantage, and in 1903, the English Kennel Club (EKC) officially added the French Bouledogue to its register.

The XXth century saw a big rise in French Bulldog's popularity all over the world, being seen with famous figures such as Colette (*fig 15*), Yves St Laurent (*fig 16*), or even Josephine Baker (*Fig 17*), who brought the breed's success to the USA.



*Fig 16- Yves Saint Laurent and his dog Moujik*  
Source: [www.minniemuse.com](http://www.minniemuse.com)



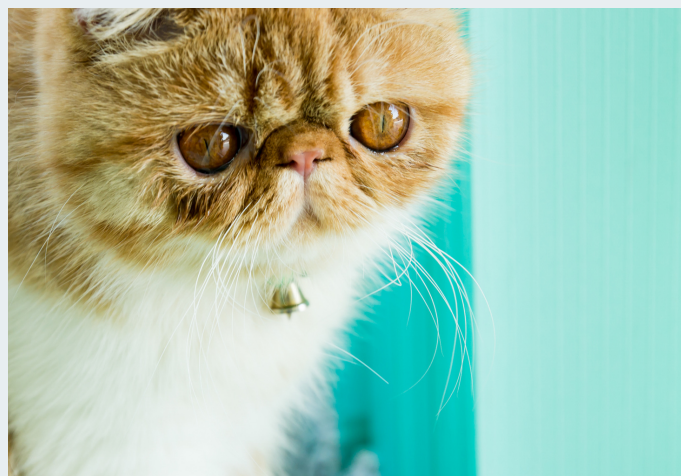
*Fig 17- Josephine Baker and one of her dogs*  
Source [www.delage-official.com](http://www.delage-official.com)

Today, after over a century of breeding, the French Bouledogue is still one of the favorite dog's breed in numerous countries, including France and USA.

It's over breeding led to a face short and shorter.

More shortening face means numerous health problems, making from them a semi-permanent inhabitant of veterinary clinics, veterinary hospitals and emergency services.

We described here 3 of the most commonly met brachycephalic breeds in dogs, but I could also talk about many others, as well as brachycephalic cats, such as the British Shorthair or Scottish Fold and extreme brachycephalic cats like Exotic Shorthair (*fig 18*), Persian (*fig 19*), and Himalayan (*fig 20*)



*Fig 18- Exotic Shorthair cat. Source: [www.canva.com](http://www.canva.com)*



*Fig 18- Persian cat. Source: [www.canva.com](http://www.canva.com)*



*Fig 19- Himalayan cat. Source: [www.canva.com](http://www.canva.com)*

Why are they so famous? What attracts people to have these breeds? Are the owners aware of the deep pathological impact this conformation has on their animals? These are the questions I tried to cover in the next part, before the hopeful conclusion about the solutions that vets, breeders, and owners are trying to find.

## Brachycephalic dogs: The owners' perception

As we mentioned earlier, the conception of the breed of dog we have today is only about a hundred and fifty years old. The development from a working dog to a companion dog has gradually led to a prioritization of the dogs' appearance instead of its behavioural characteristics (King et al., 2012). We started to look for a dog that matched our esthetical criteria rather than its ability to help us, and since fashion is always moving forward, we have observed over time waves of interest for certain breeds, and this temporary tendency is highly correlated with the number of inherited disorders they suffer from (Ghirlanda et al 2013). According to the puppy statistics of the German Kennel Club (VDH, 2017), the number of pug puppies has increased from 2002 to 2010 by 95 percent and of French bulldog puppies by 144 percent. In other European countries such as France, the number of brachycephalic dog's breed is also constantly rising, as this ICAD (Domestic Carnivores Identification) stat showed in 2017:

Nombre de chiens bracycephales identifiés en France  
(Source: ICAD 2017)

• Bouledogue Français	166 253
• Shih-Tzu	105 093
• Boxer	73 929
• Carlin	23 254
• Bulldog	5 826
• Terrier de Boston	

Table 1- Number of brachycephalic dogs identified in France in 2017- Source: 30millionsdamis.fr.

There are several reasons for this success, one of them being, of course individual tastes, that are not debatable, or also the joyful behaviors of these eternal puppies, but I chose to speak only of the sociological aspects, which explain a lot about our society and the human way of functioning.

## 01 The Kindchenschema (Baby schema) Theory

Evolution is a very complex mechanism, but there is one rule that is easy to understand for everybody: survive. In some animal's species, the offspring are born ready for life, this is not the case for humans.

According to anthropologists, the gestation period of the gender Homo used to be longer than 9 months, but, the bipedalism has made our hips narrower, in consequence, the baby's head had to shrink in order to get out from an exit that used to be wider. And so, premature births multiplied until they became the new standard of the species.

A premature baby implies a weaker baby, and a weaker baby needs a longer period of adaptation, a longer period of dependence. A new member in the tribe is a new mouth to feed in a hostile climate, and it would have been easy for the Homo sapiens male born seventy thousand years ago to decide to abandon this parasite. But they didn't, why?! The answer might be surprising: it's because babies are cute.

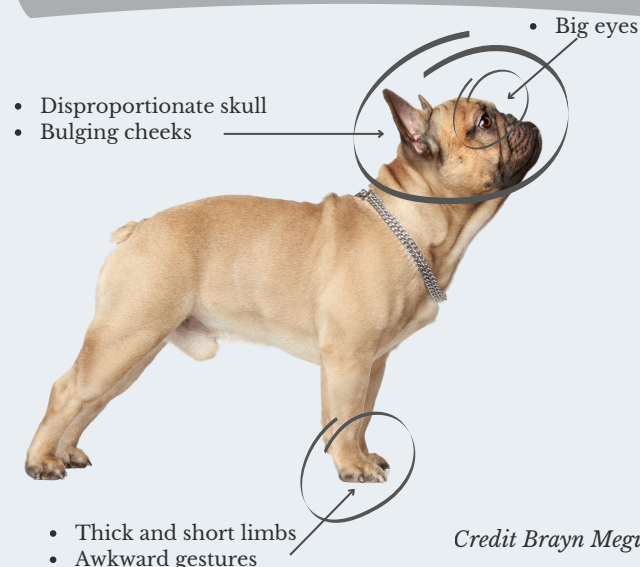
In 1949, Konrad Lorenz, an Austrian ethnologist developed the Kindchenschema theory. In other words, he tried to explain what cuteness is, and he came to the conclusion that babies, as well as offspring from most species share the same features that create in humans, as well as in most animal's species, the motivation to take care of them. It is in humans, as in most animals, a supernormal stimulus: an evolutionary tendency from attraction to exaggeration.

According to Lorenz, these features are:

- Big eyes,
- A disproportionate skull
- Awkward gestures
- Bulging cheeks
- Thick and short limbs.

You probably understood my point; people's attraction for brachycephalic breeds can be explained, in part, by this theory: we are attracted by them, because they keep these features all their life.

## Anatomy of an Eternal Puppy



Credit Brayn Meguira

## 02 The Savior Complex Theory

According to Packer et al (2012), around 50% of brachycephalic breed dogs owners are not aware of the health issues of this breed. From this data we can already draw an interesting conclusion: we need to raise the awareness of brachycephalic breed's pain. But this is not the point I want to speak of for now.

Let's start with the people who are aware. As I mentioned in our last issue (*K9 in the army- "The Campus" issue 3*), human beings in history always had the tendency to think that without their intervention, animals, and nature, won't make it to survive. We can also observe this in our human interactions, namely the Savior complex, the need to help, to be useful, the feeling that we are part of the solution. Of course, empathy is personal, and each one of us is unequally concerned by this phenomenon. This idea can be applied to brachycephalic dogs. Knowing that they tend to have health issues is already more knowledge than 50% of the population. It means that half of the brachycephalic dogs could be adopted by people unaware of their needs, while we are. Therefore, instead of looking for a healthy animal, we will be naturally attracted to the one to whom we can give what others cannot.



Fig 20- Source: people.com

## 03 The Acceptance as 'Normal' of Pathological Conditions

Our world is full of sounds, images, smells, that our brain chooses to ignore. For example, did you know that both of your eyes always see your nose, but you only chose not to see it, because this is an unnecessary information in a world full of stimuli? This phenomenon is called habituation. This idea can be applied to brachycephalic animals' pathologies.

Since most of the Bulldogs snore, we tend to consider it as physiological for this breed.

Most of the pugs cannot walk for five minutes when it's hot outside- but it's normal, for pugs. French bouledogues have their eyes popped out- but again, it's funny, it might be scary, but more and more people are not worried- they know that French bouledogue are known for this feature. They ignore, or forget, or get used to the fact that they are suffering.



Fig 21- The BOAS awareness campaign by Dr Seralp Uzun in 2018

## 04 The Social Media Influence

The last theory I want to mention for brachycephalics' popularity, is of course the influence of social media.



Fig 22- Lady Gaga with her 3 Frenchies. Source: news.sky.com

As I mentioned in my introduction, Brachycephalic breeds have become the internet's icon. Unfortunately, for the bad reasons. We would love to read as much information as possible about the suffering they have to go through all their lives, but most of the time, they are shown for all their characteristics people find funny, or because they are famous peoples' favorite pets, so people feel closer to their idol when imitating a social scheme.



Fig 23- Hugh Jackman and his Frenchie Source: thedodo.com

## Brachycephalic dogs: Veterinarian's perception

### *Why do they suffer that much?*

As we saw, brachycephalic breeds have a very particular conformation, especially due to their very particular skull. It is important to understand better what are the consequences of this: all the structures presents in a dolichocephalic (elongated) skull are also present in a brachycephalic, but the space is reduced (fig 24)

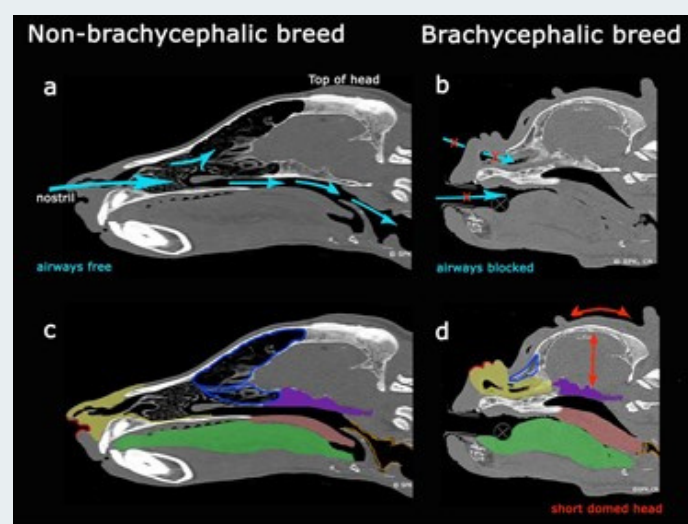


Fig 24- CT slices through the middle of the head of a non-brachycephalic dog (A) and a brachycephalic dog (B).

- **Purple** - A common feature of brachycephalic dogs is that the skull base (purple) is short because it stopped growing prematurely. The consequence is that the cranium (box that holds the brain) is shorter.
- **Red arrows** - However, it is essential that the brain be protected by the skull box, so in response, the developing brachycephalic puppy adapts by making the box that holds the brain taller and consequently the top of the head becomes rounder and domed (bright red arrows).
- **Dark red** - The muzzle is shorter and the nose that is more "button like" (dark red) lies between and just below the eyes.
- **Blue outline** - A reduction in the frontal sinus means that dog has "broad flat forehead". Source: <https://www.bva.co.uk/>

The excess soft tissue will go where it will find space: thus, it will obstruct the airways, making the respiration almost impossible by the nose, and forcing the dog to breath through his mouth, with difficulty.

According to the Cambridge University Department of Veterinary Medicine «one of the big reasons brachy dogs snuffle is that their soft palate—the flesh on the roof of their mouths—is too long, a vestige of when they had longer snouts. The palate reaches back into their airway, partially blocking it when they breathe. When the dog pants, extra effort is required to move the soft palate out of the larynx in order to allow air to pass. If the dog is breathing through its nose, the extra-long palate creates the same kind of suction as in snoring, sometimes leading to so-called “awake snoring.”»

The nostrils of Brachycephalic dogs are also narrower to that of other dogs, multiplying their risk to die from respiratory problems up to seventy times more than any other breeds! (Study of the Danish dog insurance data for PLOSONe).

That's why, in 2017, the British Veterinary Association (BVA) launched an awareness campaign dubbed #breedtobreathe. According to their official website, the #BreedToBreathe is calling for collective action to drive healthier standards by:

- Reviewing breed standards according to evidence;
- Encouraging research to better understand and address the welfare impacts resulting from brachycephaly;
- Supporting the Kennel Club's project to develop Breed Health and Conservation Plans and considering the potential role for evidence-based outcrossing.
- Developing brachycephalic health assessments and using standardized exercise tolerance tests (ETTs) and functional grading systems; and
- **Avoiding imagery of brachycephalic dogs in advertising, marketing materials, and social media to reduce demand and prevent normalization of the health issues.**

They also published a 10-point plan for veterinary practices:

- 01** Offer pre-purchase consultations, such as the PDSA “Which pet?” consultation framework, with prospective dog owners. The potential health problems of brachycephalic conformation can be clearly outlined in these consultations
- 02** Strongly advise against breeding if a dog is suffering from BOAS or requires conformation altering surgery – consider neutering (where best practice allows) to prevent further litters with extremes of conformation that negatively impact on their health and welfare
- 03** Promote the Puppy Contract (comprising the Puppy Information Pack and contract for sale) through the practice communication channels, eg. website, social media, waiting room displays, newsletters and in local print and broadcast media
- 04** Promote and actively participate in available health schemes (eg. BVA/KC Health Schemes), including those for brachycephalic breeds that currently exist amongst Bulldog, French bulldog and Pug breed clubs
- 05** Carry out exercise tolerance tests (ETT) and functional grading for brachycephalic breeds as part of their annual health assessment
- 06** Enrol the practice in clinical surveillance programmes such as VetCompass and SAVSNET, to contribute to data gathering and evidence generation

**07** Develop a practice communication strategy to repeatedly, clearly and consistently communicate the health problems experienced by dogs with brachycephalic conformation through the practice communication channels

**08** Develop practice policy to ensure that practice communication channels (particularly social media and advertising materials) do not portray dogs with brachycephalic conformation as cute, humorous or appealing

**09** Ensure practice policy supports staff to appropriately convey evidence-based information and advice to owners of dogs with brachycephalic conformation

**10** Support local breed clubs and representatives to develop and implement plans to improve the health of dogs with brachycephalic conformation (<https://www.bva.co.uk/take-action/our-policies/brachycephalic-dogs/>)

We all have, as Veterinary doctors, Vet students, or even dog lovers to take part in this project, at our level. In Our Faculty, Dr. Seralp Uzun is constantly informing and warning about the Brachycephalic breeds' condition, through workshops, conferences that he has been invited to and campaigns with other doctors in Surgery Department, Cardiology and other Hospital doctors. You will find more details in my colleagues interviews you will find in this issue.



Fig 25- The cover of a brochure published by our University to inform Brachycephalic dog owners.

## Conclusion

In the last few pages, I tried to follow these breeds history and condition as faithfully as possible, but there is one thing that I forgot to mention; having a Bulldog, a Pug, or a Persian cat is not only about veterinary checks, surgery, and short walk, but also about deep connection, intense love, and faith.

These animals are ready to give their lives for us; let's give them something in return: a deep breath of fresh air.

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*"Look how cute it is when he snores"*

*That's one sentence you probably have heard many times amongst brachycephalic dogs' owners. However, what is taken for cuteness, actually comes at the expense of the dogs. Because the so popular little nose cocooned in skin folds (brachycephaly) is the evil of many sufferings. In the mind of people, heavy breathing connotes a poor taste for physical activity and thus, brachycephalic dogs are labeled as lazy when they really are suffocating. The supposed character trait of "laziness" is therefore a health impairment (pathology) that has arisen through questionable breeding programs.*

The term brachycephaly means short-headedness and describes a breeding intended shortening of the facial skull. It is described in dogs as well as in cats.

Dogs and cats are referred to as brachycephalic or short-nosed if the length of the nasal skull falls below a critical level.

How does a brachycephalic skull look like?



Fig 1- The typical classification of dogs' head shape based on the cephalic index value. Cephalic index (CI) is the ratio of the maximum width of the head (A) multiplied by 100 divided by the head's maximum length (B). The shorter a dog's head is, the higher the cephalic index.

Source: <https://doi.org/10.1038/s41598-021-88702-w>

Fig 2- (On the right side )Stenotic nares grading system.

Source [www.researchgate.net](http://www.researchgate.net)

Brachycephalic breeds include French Bulldog, English Bulldog, Continental Bulldog, American Bulldog, Pug, Shih- Tzu, Pekingese, Lhasa Apso, Boston Terrier, Cavalier King Charles Spaniel, Boxer, Chihuahua, ... And amongst cats we find Persian, Scottish fold, Exotic and British Shorthair, ...

What are the anatomical modifications encountered?

- Primary changes
  - Stenotic nares: Airflow into the nasal cavity is restricted and greater inspiratory effort is necessary, causing mild to severe breathing difficulties.



If the narrowing is severe, surgical correction is indicated. Secondary to the heavy effort to breathe, breast muscles develop considerably. You can grade the stenosis depending on the breed and the opening of the nares (Fig 2).

- **Elongated soft palate:** The soft palate, which separates the nasal passage from oral cavity, is long and flaps loosely down into the throat, creating snoring like sounds. This further narrows the airway passage, but it can be surgically trimmed.
- **Hypoplastic (stenotic) trachea**

### ● Secondary changes

- **Everted laryngeal sacculles:** soft tissue swelling at the level of the throat. The sacculles should be surgically removed as their presence causes great narrowing of the airway passages and indicates severe disease.
- **Everted tonsils**
- **Soft palate edema**
- **Laryngeal paralysis/collapse:** "This increased inspiratory effort generates a high negative pressure that sucks the soft tissues into the lumen of the airway passage. Eventually, these tissues become hyperplastic and the laryngeal cartilages collapse, further exacerbating the airway obstruction. If this cycle is left uninterrupted, the dog may develop pulmonary oedema, reduced arterial oxygen content, hypertension and right-sided heart failure."
- **Tracheal collapse**

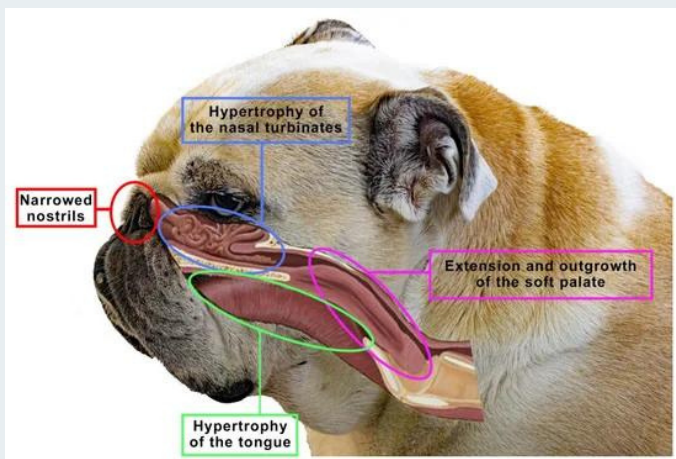


Fig 3- BOAS anatomy of changes. *The Shape of the Nasal Cavity and Adaptations to Sniffing in the Dog (Canis familiaris) Compared to Other Domesticated Mammals*  
Source: mdpi.com

### What do these modifications imply?

If we take a quick look at a physics law (Loi de Poiseuille) we can easily understand the consequences of narrowed respiratory airways.

The Loi de Poiseuille says that if we have a tube with a given airflow, and that we create an obstruction taking 50% of the free space inside the tube (meaning we reduce the radius of the tube where the airflow passes) we increase by 16 times the resistance to flow and therefore the effort needed to keep the exact same airflow as initially.

### Signs and Symptoms:

- **Noisy breathing** with varying levels of respiratory difficulty
- **Panting** even in a cool and quiet location
- **Exercise intolerance:** This is where body temperature regulation comes into play. While humans and certain animals can sweat, dogs and cats must do so through the panting process. The few sweat cells on the feet are not enough. When panting, air is sucked in through the nostrils at high frequency.
- **In the nose,** air sweeps past the large surfaces of the nasal turbinates and is moistened before it is released again over smaller areas in the mouth, so the body gets rid of moisture and thus excess heat. In brachycephalic dogs, these large surfaces in the nasal cavity are drastically smaller. As a result, the short-nosed dog can hardly cool down and will not be able to walk far during physical exertion or high outside temperatures before lying down, panting, and thus lowering the body temperature back to normal levels.
- **Restless sleep:** because they have a thickened tongue base, a long and/or thickened soft palate, and hypertrophied nasal turbinates, which can obstruct the airway during closed-mouth breathing. They present life threatening dyspnea and sleep apnea.
- **Collapse and cyanosis:** because of their anatomical particularities, they may not be able to meet their oxygen requirements. If the dog's oxygen levels are not stabilized immediately, collapse or unconsciousness can happen. Cyanosis can be spotted on the gums.
- **Stress, excitement** and increased heat and humidity frequently make clinical signs worse.
- **Gastrointestinal signs:** retching or gagging, vomiting, trouble eating and excessive salivation. Caused by the elongated soft palate impeding the swallowing function, a hiatal hernia, esophageal diverticula.
- Also, the chronic increase in thoracic airway pressure draws the stomach into the chest, causing gastroesophageal reflux.

## Recognize the specific respiratory noises:

- **Pharyngeal noise:** stertorous sound
- **Laryngeal noise:** stridor sound
- **Nasopharyngeal noise**
- **Reverse sneezing**

## Functional grading system (using the 3 minutes trotting exercise with a pre and post assessment of the dog):

Because some dogs don't present strong signs at rest, we need to perform an exercise and assess their general state and respiratory noises before and after this test in order to grade the severity of their syndrome.

**Grade 0 and I** are considered clinically unaffected; **Grades II and III** are considered clinically BOAS-affected and they require management and treatment.

Test Result reference:

**Grade 0** – BOAS free; annual health check is suggested if the dog is under 2 years old.

**Grade I** – clinically unaffected but with mild respiratory signs, annual health check is suggested if the dog is under 3 years old.

**Grade II** – BOAS affected with moderate respiratory signs. The dog has a clinically relevant disease and requires management, including weight loss and/or surgical intervention.

**Grade III** –BOAS affected with severe respiratory signs. The dog should have a thorough veterinary examination with surgical intervention.

## Diagnosis

- Blood tests & biochemistry to assess the general state of the animal before any anaesthesia and surgery. Note that polycythemia can be encountered due to chronic hypoxia.
- Physical examination: Stenotic nares: opening less than 1/3 width of the nose in BOAS
- Laryngeal examination: Soft palate extends beyond epiglottis and visible saccules

## How to proceed?

Examine under light anesthesia using Thiopental to effect, because it provides the best assessment as other induction agents may inhibit arytenoid movement. Place the tongue in a normal position and evaluate the palate length regarding the tip of the epiglottis. Finally, check for the ability to see the saccules (if yes, there is an eversion).

Note that surgical procedures to address laryngeal collapse directly are rarely performed and are associated with significant complications and morbidity, but most surgeons agree on correcting the other BOAS related defects and the general state is frequently improved despite persistence of laryngeal collapse. However, in case of complete laryngeal paralysis, the condition needs to be addressed to ensure a good recovery of the dog.

## Imaging examination:

- Upper respiratory tract endoscopy (pharyngoscopy and laryngoscopy)
- Upper digestive tract endoscopy
- Radiography of the thorax and assessment of tracheal hypoplasia (can be done under anesthesia if and only if no respiratory distress consequent to contention applied during examination, is present). The ratio of the tracheal luminal diameter at the thoracic inlet to the diameter of the thoracic inlet itself (TD/TI) should be less than 0.20. The ratio of tracheal luminal diameter at the midpoint between the thoracic inlet and the carina to the width of the third rib (TT/3R) should be less than 3.0.
- Ultrasound can be performed to evaluate pulmonary and cardiac health.
- Scanner and/or MRI (to highlight soft palate characteristics and nasal turbinate malformation. Also used sometimes to plan the surgeries.)

## Complications:

Secondary to respiratory function impairment we can see the following pathologies appear:

- Secondary Hiatal hernia
- Aerophagia
- Bronchopneumonia by aspiration

## Medical management:

The main role for medical management is in the initial stabilization and triage of a respiratory emergency (sedation, cooling, glucocorticoids, supplemental oxygen), treatment of regurgitation or aspiration pneumonia, or to try to alleviate the severity of clinical signs in those with advanced disease.

Treating gastrointestinal pathologies and especially gastro-oesophageal reflux disease (GORD) is an important step for a good recovery and improvement of the animal's quality of life.

The histological findings from any endoscopic biopsies collected will give you the information needed to pick up the right treatment, which usually consists of a proton-pump inhibitor (i.e. Omeprazole), a prokinetic (i.e. cisapride, metoclopramide (also a good anti emetic), erythromycin and a surface protector (i.e. sucralfate). The basis for using these medications is the high incidence of gastritis, oesophagitis and GORD in BOAS.

### Surgical management:

For all the surgeries, the dog must be placed in sternal recumbency and the maxilla must be suspended while the mandibula is fixed on the surgery table. Secure the endotracheal tube.

### Anesthesia particularities

There are no anesthetic drugs that are specifically contraindicated in brachycephalic breeds and the veterinary surgeon is advised to adhere to the following principles:

- Airway maintenance: perform minimal sedative premedication. Perform pre oxygenation for 5 mn and rapid intubation following a light induction (avoid heavy sedation which could lead to excessive upper airways relaxation).

Use fast recovery agents either for induction or maintenance and prefer the ones causing the least hangovers. Use reversible agents for sedation.

This is justified by the fact that the most problematic period in BAOS animals is often the recovery period as they are sufficiently awake to see light and chew their ET tube but not enough to maintain a functioning airway. So, we try to have a fast recovery and a minimal hangover, if possible, avoid the use of long-acting drugs (such as acepromazine). The alpha-2-agonists medetomidine and dexmedetomidine must be used very carefully and if so, the upper airways must be put under strict surveillance.

- Reduce the incidence of regurgitation, emesis, gagging. Maropitant or metoclopramide are drugs of choice to prevent emesis and regurgitation.
- Administer induction agents slowly IV to effect and ensure the dog is deep enough to avoid gagging or coughing when proceeding to intubation.
- Make sure that analgesia is excellent using opioids, local anesthetics and adjuncts such as ketamine.
- Always place IV catheters (at least 1 in non-emergency patients, 2 in emergency patients.)

The rules for endotracheal (ET) tubes are that the largest diameter to fit the airway without inflating the cuff should be used and the length should not be excessive – the connector should lay at the level of the incisors.

Example of protocol:

Perform a minimal sedative premedication (unless nervous and hyperventilating and even here we use higher dose compared to calm brachycephalic animals but still lower dose than for animals that are not brachycephalic).

Opioids in low dose can be used for analgesia, butorphanol is a good option. However alpha 2 agonists (dexmedetomidine) also provide analgesia. When combined with other drugs in the premedication protocol, dexmedetomidine can provide a sufficient analgesia and myorelaxation for small surgeries.

- Dexmedetomidine + butorphanol + ketamine ... (The use metoclopramide as anti-emetic and enhancer of intestinal peristalsis is advised). Perform preoxygenation for 3 to 5 minutes and induce anesthesia adding propofol very slowly IV.

- ... + propofol

We can consider lidocaine bolus post-induction agent to ease intubation and avoid vagal stimulation (knowing that vagal tone is increased in brachycephalic breeds). We choose a maintenance agent with a fast recovery profile too, such as sevoflurane or isoflurane.

Intubate. Use an endotracheal tube that fits comfortably the airways, note that you will often need a smaller tube than what you would estimate for another dog breed of the same size.

Monitor the CO<sub>2</sub> expired, the oxygen saturation, the temperature, heart rate and arterial pressure which must be above 60-70 to ensure the good perfusion of all the organs and especially of the kidneys. Give 5mg/kg/h of fluids and if the dog is hypotensive, add up to 10ml/kg/h.

After surgery, reverse the anesthesia and **DELAY THE EXTUBATION AS MUCH AS POSSIBLE**. You need to leave the ET tube until you are sure that the dog will be able to maintain a patent airway.

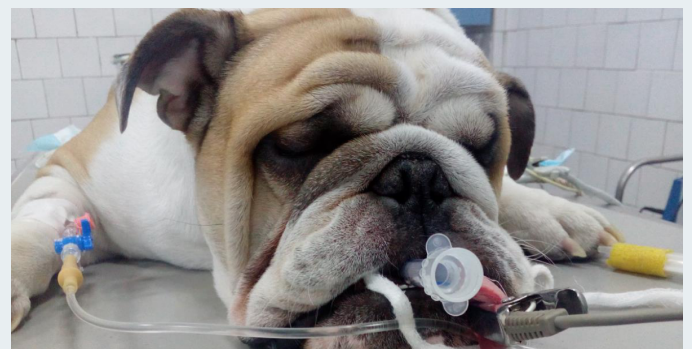


Fig 4- Delayed extubation. Source: FMVB Surgery department

## Rhinoplasty

There are 2 techniques you can perform, a wedge resection and a laser ablation. When the wedge resection technique is feasible, it is often preferred to the laser ablation, because the laser tends to char the edges of the incision causing the superficial layer of the nose to slough and leaving a white depigmented area that is aesthetically unpleasant. It also is less precise and leaves scars. However, in cats, wedge resection is not doable due to the size of the nares, so the best results are obtained through laser rhinoplasty.

### Wedge resection

There are 2 techniques you can perform, a wedge resection and a laser ablation. When the wedge resection technique is feasible, it is often preferred to the laser ablation, because the laser tends to char the edges of the incision causing the superficial layer of the nose to slough and leaving a white depigmented area that is aesthetically unpleasant. It also is less precise and leaves scars. However, in cats, wedge resection is not doable due to the size of the nares, so the best results are obtained through laser rhinoplasty.

Commonly we have 2 options:

*Vertical resection* using n11 blade and PGLA: “removal of the pyramid - shaped piece from the nasal concha. The incision is made vertically parallel with an angle of approximately 40°. (N°11 scalpel) The other incision is made at an angle of 40° to the first incision. Making the incision deep is important in terms of opening the respiratory tract. In other words, the incisions should go down to the alar cartilage in the caudal.”

*Horizontal resection* using n11 blade and PGLA: “take the pyramid -shaped piece from the side wing of the nose. The incision is made up to the dorsal of the area up to the mucosal turbinate. The point to be considered in this technique depends on paying attention to the mucosal area when removing sutures. Because the mucosal region is necessary for the closure of the incised region.”

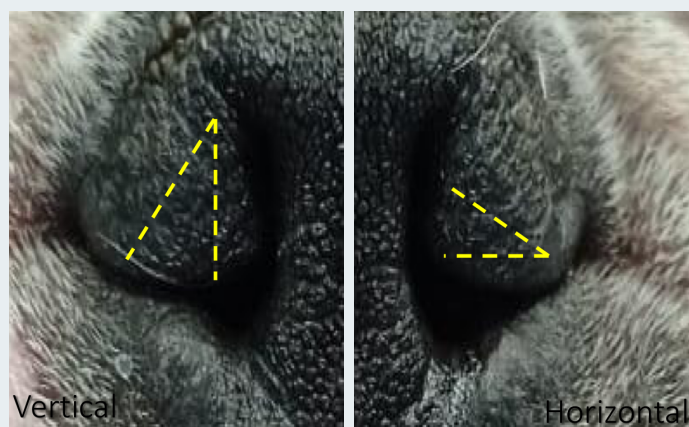


Fig 5- Vertical and horizontal wedge resection methods. Source: FMVB Surgery department

But a 3rd option has recently been used with a great deal of success. It consists in removing a wedge of the LATERAL alar cartilage (instead of the rostral) which leaves more of the rostral alar fold allowing a deeper incision and easier suturing.

*Laser ablation* is removing the medio-ventral aspect of the dorsolateral nasal cartilage. Set the laser on the continuous cutting in a medial to lateral angle to prevent depigmentation.

## Staphylectomy or elongated soft palate resection

Choose the landmarks to know where to cut the soft palate. The junction where the soft palate and epiglottis touch determines the excision point of tissue (tip of the epiglottis and the middle to caudal aspect of the tonsillar crypt are also acceptable landmarks). When evaluating this junction, it is extremely important that the animal be extubated, with no traction placed on the tongue.

Re Intubate the patient and pack gauze sponges in the back of the oral cavity to prevent blood from draining caudally through the nasopharynx into the trachea.

In the classical approach, after patient preparation, the surgeon places two stay sutures on the lateral edges of the soft palate. A third stay suture can be placed on the middle edge or it can be held with forceps.

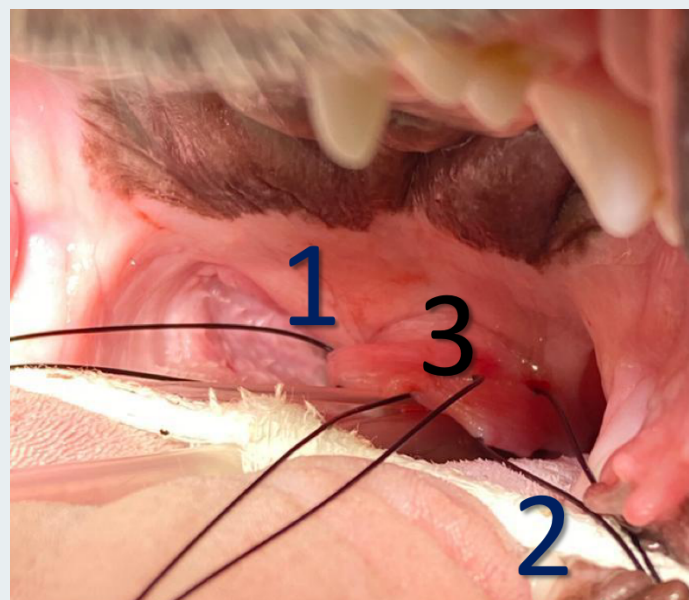


Fig 6- In the surgery picture. Placing the stay sutures. Source: FMVB Surgery department.

Using long Metzenbaum scissors to resect the soft palate 2mm caudal to the landmarks up to the middle edge. The aim of a half cut is to control excessive bleeding. Suture this first half portion in a simple continuous pattern. Reproduce the operation on the second half of the soft palate.

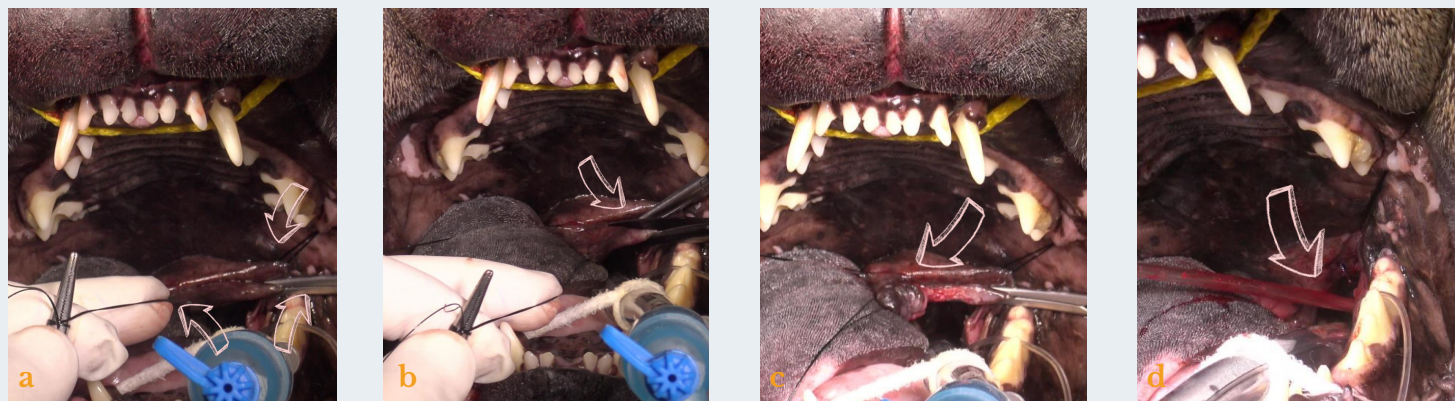


Fig 7- In the surgery pictures. a. Placing the forceps. b. and c. Cutting the half portion of the soft palate. d. Aspirating the blood after total resection. Source: FMVB Surgery department.

## Sacculectomy

Eversion of the laryngeal saccules is considered the first stage of laryngeal collapse. Some authors recommend temporary tracheostomy to help visualize the saccules and resect them. However, you can also proceed by temporary extubating or even by pushing the ET tube on one side. Then grab the saccules with long hemostats, retract them rostrally and excise them with a scalpel blade or Metzenbaum scissors. Hemorrhage is usually minimal.

## Tonsillectomy

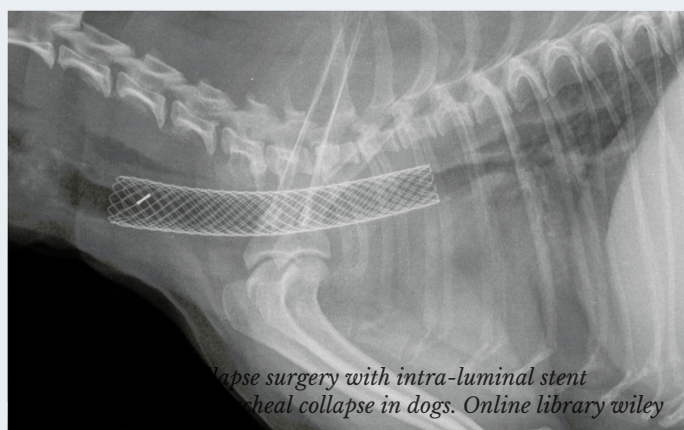
Because the additional inflammation created with tonsillectomy has little to no benefit, it is not recommended. In the Poncet study 10 dogs in which other upper airway abnormalities were corrected but no tonsillectomy was performed, were reexamined 6 months postoperatively and all of the 10 dogs showed significant improvement or complete resolution of all macroscopic tonsils' abnormalities.

## Laryngeal paralysis surgery

Used for grades II and III of laryngeal saccules eversion. The best option is the Arytenoid lateralization laryngoplasty, otherwise a permanent tracheostomy is recommended if the animal is in respiratory distress and if partial laryngectomy fails.

## Tracheal collapse surgery

The goal of this surgery is to support the tracheal cartilages and trachealis muscle and preserve as much nerve and blood supply to the trachea as possible.



Nowadays, the only techniques that meet this goal are placement of extraluminal individual rings or modified spiral ring prostheses, or intraluminal stents.

Intraluminal stent placement promotes a better preservation of nerves and blood supply but are expensive, require endoscopic surgical placement, and can cause severe complications.

Patients with concurrent laryngeal paralysis or laryngeal collapse may also require arytenoid lateralization or permanent tracheostomy, respectively.

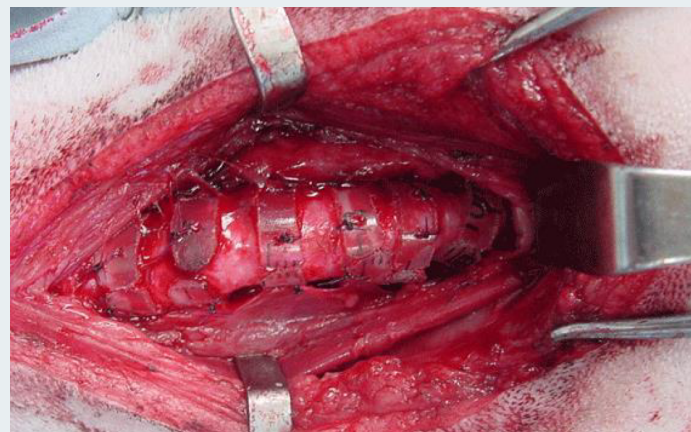


Fig 9- Tracheal collapse surgery with extra-luminal ring technique. Source: Tracheal collapse in dogs. Online library wiley

## Post operative management and complications

Delay extubating and prevent water intake for 12 hours.

Antibiotics commonly recommended for treatment of upper respiratory disease include ampicillin, fluoroquinolones, cephalosporins, aminoglycosides, doxycycline, azithromycin, and potentiated sulfonamides.

Send the dog home on the same day because it will be less stressful, and the dog will avoid hyperventilating.

Possible complications are:

- Inflammation leading to respiratory distress
- Coughing
- Hemorrhage in staphylectomy
- Vomiting
- Aspiration pneumonia
- Noncardiogenic pulmonary edema
- Nasal discharge

### When is it considered as an emergency?

Emergency patients are the ones presenting heavy respiratory distress, panting, stertor or/and stridor, tachypnea, dyspnea, cyanosis, hyperthermia and at last stage collapse.

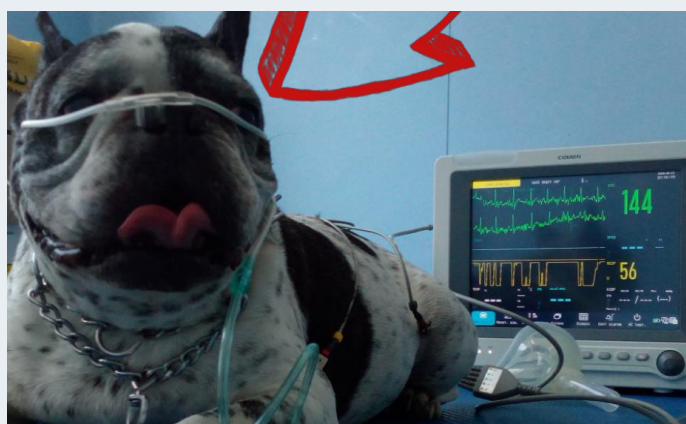


Fig 10- Boas patient in emergency. Source: FMVB Surgery Department

### What should you do?

- Keep calm
- Check the vitals (airways, CRT, mucous membranes, respiratory rate, heart rate, pulse rate, temperature)
- Then perform emergency stabilization for respiratory distress, tachypnea, hyperthermia, gastric dilation, and collapse

EMERGENCY stabilization summary			
<b>O<sub>2</sub> delivery</b>	<b>IV catheterization</b>	<b>tracheostomy</b>	<b>hyperthermia</b>
flow-by	ringer simple	in severe cases	ventilator
intra nasal	NaCl 0,9%	gastric	air-condition
oxygen cabin	<b>sedation</b>	<b>decompression</b>	tofedine
transtracheal	butorphanol	<b>can be needed</b>	4mg/kg IV
tracheostomy	0.2mg/kg IV		<b>reducing stress</b>
	diazepam		<b>factor</b>
	0.2mg/kg IV		<b>isolation</b>
	<b>intubation</b>		
	<b>when</b>		
	<b>necessary</b>		

Fig 11- Emergency stabilization summary. Source BOAS presentation, Surgery III lesson, Dr. Seralp Uzun

### Prophylaxis

- Avoid obesity: Excessive weight results in fat tissue surrounding and narrowing the airway. Therefore, a weight loss program should be implemented to improve respiratory function in overweight brachycephalic dogs.
- Avoid outdoor activities in hot days

### Conclusion

BOAS is the result of a poorly ethical selection and reproduction of defects in the brachycephalic breeds representatives. What passes for a trend is in reality borderline cruelty. Even so, Norway recently banned the breeding of 2 brachycephalic dog breeds to try and stop the proliferation of anatomical defects putting the dogs' health at risk.

Dogs have been Humanity's best friends for centuries, and they do not deserve to be the targets and victims of our whims and caprices. Purchasing and seeking for hyper types participates actively in the subsequent birth of diseased and suffering dogs.

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# DOES YOUR DOG HAVE CHAMELEON EYES? BOS: BRACHYCEPHALIC OCULAR SYNDROME

*Interview with Dr. Iuliana Ionașcu  
by Claudia Schimenti*

*You already learned in the previous articles that in order to conform to the current breed standards, the brachycephalic dogs and cats display characteristic facial features including their bulging or popped eyes.*

*The brachycephalic animals display these specific anatomical features where their orbit is too shallow, and their eyelids too far apart. This negatively impacts their blinking function as well as the quality and/or quantity of their tear film, causing secondary corneal pathologies commonly called Brachycephalic Ocular Syndrome (BOS).*

The BOS group may include an exophthalmos due to their shallow orbit and macropalpebral fissure, as well as an exposed sclera, conjunctiva and cornea. An ocular proptosis may also develop with its secondary corneal lesions such as a superficial deep corneal ulcer, a descemetocoele, etc. Due to their divergent strabismus and their incomplete blinking, the affected animals have a cornea that is severely exposed to the environment and to their own facial folds and hair.

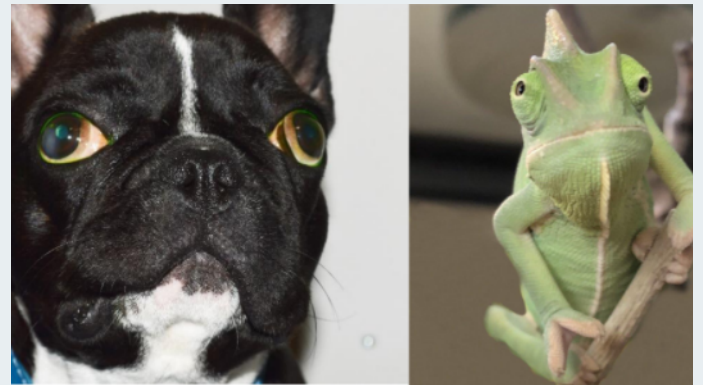


*Fig 1-Divergent strabismus. Credit: Dr. Iuliana Ionașcu*

Even if they are bred for their funny baby look with wide eyes that make them look so cute to their owners, it is the very reason why the brachycephalic pets are prone to develop so many ocular pathologies.

The qualitative and quantitative deficiency of their tear film also worsens the corneal diseases they may develop, while the permanent irritation of their cornea associated with their incomplete blinking function will cause an exposure keratitis.

When this situation becomes chronic, it will become a pigmentary keratitis that will decrease their vision. Meanwhile, a medial entropion and medial caruncular trichiasis will twist their lacrimal canaliculi and therefore conceal their lacrimal puncta. As you can see, the BOS group includes various pathologies, some of which I will now present further and see how they are treated by veterinarian doctor.



*Fig 2-Unlike the voluntary strabismus that naturally developed in chameleons as an adaptation to their environment, the brachycephalic animals were artificially bred this way by humans and suffer from the abnormal anatomy of their eyes. Credit: Left: exophthalmos and divergent strabismus of both eyes, Dr. Iuliana Ionașcu ; Right: Mark's Chameleons, Twitter.*

## • Proptosis, the most impressive

Most commonly secondary to a trauma such as a fight with other dogs, eyeball proptosis is an ocular emergency in which the ocular globe suddenly protrudes out of its orbit. It is particularly common in brachycephalic breeds due to their shallow orbit minimally protected by their bony skull structure and their macroblepharon, even after a minimal trauma.

The eyelids are then stuck behind and press the eyeball, and will become inflamed and swollen. Consequently, the eyelids don't protect the cornea anymore, leading to its desiccation and ulceration, as well as an obvious conjunctival edema called chemosis.

As a veterinary practitioner, you should pay careful attention to never restrain any brachycephalic animal using traditional neck-holding methods or by applying any pressure around their face, as you could generate an iatrogenic ocular proptosis, on top of making their respiration difficult while they already have troubles breathing.



*Fig 3- Right eyeball proptosis with obvious chemosis. Credit: Dr. Iuliana Ionascu.*

An eyeball proptosis is easy to diagnose based on its visual evidence. Repositioning the eye into its orbit must be done as quickly as possible to avoid any complication. It is mandatory to perform a temporary tarsorrhaphy and to keep the sutures into place for 3 weeks, unless the proptosis happened due to a brutal restraint and the eyeball was repositioned right away.

Also take into consideration that a patient with an eyeball proptosis has most likely suffered from some kind of trauma, so don't limit your patient's examination to his eye.

### • Corneal ulceration, the most frequent

A corneal ulcer is a lesion of the anterior epithelium, basal membrane and stroma of the cornea. The cornea being the transparent tissue coating the eyeball, it must remain clear to support the eyesight function, which is negatively impacted when an ulcer is present.

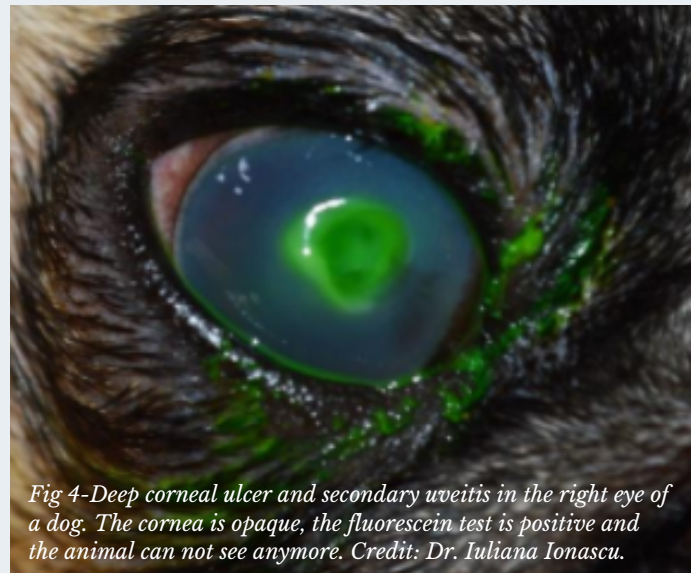
Between their eyelids not fully protecting their eyeball and their flat head, the brachycephalic breeds cornea is always in the vicinity of everything they smell, touch, taste or play with, increasing the possibilities of something entering into direct contact with it.

The corneal ulcers can develop secondary to a number of causes, including irritating substances, eyelid abnormalities like medial entropion and macroblepharon, lagophthalmos, anomalies of their eyelashes conformation (trichiasis, distichiasis), trauma, bacterial infections, or dry eye.

The brachycephalic animals can also accidentally self damage their cornea while simply rubbing their nose on their paws.

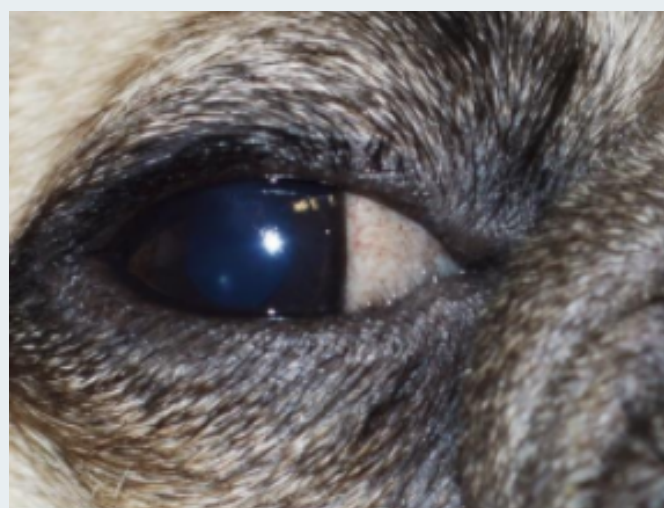
### • The medial canthoplasty surgery

The medial canthoplasty is a surgical technique that corrects many of the features contributing to the Brachycephalic Ocular Syndrome:



*Fig 4-Deep corneal ulcer and secondary uveitis in the right eye of a dog. The cornea is opaque, the fluorescein test is positive and the animal can not see anymore. Credit: Dr. Iuliana Ionascu.*

- the exophthalmos due to the shallow orbit;
- the medial canthal entropion, where the inner corner of the eyelid is rolled inward, thus irritating the eye;
- secondary to that, the medial caruncular trichiasis where the eyelashes are in direct contact with the cornea the macroblepharon (protruding eyeball) and lagophthalmos (incomplete eyelids closure)



*Fig 5-Medial (nasal) entropion of the right eye in a brachycephalic dog. Credit: Dr. Iuliana Ionascu.*

The medial canthoplasty reduces the size of the palpebral fissure, removes the medial caruncular trichiasis, and everts the medial entropion, thereby reducing the corneal exposure, mechanical irritation from trichiasis and functional nasolacrimal apparatus obstruction. This surgery increases the protection of the cornea and thus reduces the frequency of the corneal trauma.



Fig 6-

Left: Pug with a BOS, protruding eyes displaying a divergent strabismus, widely opened eyelids showing the sclera (white-red) even when the dog is looking straight ahead. Right: The same pug after correction of his BOS thanks to a reduction of his palpebral fissure by a medial canthoplasty surgery. Credit: Claudia Schimenti drawings inspired from pictures of Dr. Iuliana Ionascu.



Writing this article, I had the occasion to ask a few questions to Associate Professor Iuliana Ionascu, who is teaching in the Faculty of Veterinary Medicine of Bucharest from which she graduated in 1997. She is a pioneer in our profession and has

managed in the 25 years of her career to outline veterinary ophthalmology as a distinct branch in veterinary medicine in Romania

She performed for the first time in Romania all the diagnosis techniques in ophthalmological examination and the surgery treatments she did, succeeding to bring the veterinary ophthalmology domain of this country at the same level as the rest of Europe.

In 2003 she started to perform cataract surgeries in dogs and cats. She also performed electroretinography for the first time in Romania (2012) as a method of diagnosis of retinal diseases, and the evaluation of the chromatic pupillary light reflex using IrisVet® (2011), for certain and early diagnosis of glaucoma, retinal and optic nerve disorders. Using ClearView® (2013), she brought information about the differential diagnosis of congenital and acquired retinal diseases as well as developmental abnormalities of the eyeball (persistence of the hyaloid artery and the presence of the primitive vitreous). In 2009 she used for the first time in Romania the collagen contact lenses VetShield® for corneal surgery in indolent corneal ulcer and melting corneal ulcer.

In 2013 she used for the first time in Romania human and bovine amniotic membranes in corneal surgery, as an option after keratectomy in feline corneal sequestrum and in deep and melting corneal ulcers. Since 2013 she is performing the intrascleral prosthesis in dogs and cats as an aesthetic surgical option in cases of glaucoma and buphthalmos. Since 2019 she is performing eye surgeries using the diode laser for trichiasis, distichiasis, eyelid tumors, uveal cysts, iris melanosis, iris tumors and retrobulbar tumours.

Since 2021, she is using the SBM Sistem® to establish the differential diagnosis in keratoconjunctivitis sicca due to the quality of the tear film and the treatment is performed differently.

Throughout her career she also published scientific articles and books of veterinary ophthalmology: "Atlas of Veterinary Ophthalmology" (Romanian and English in 2013 first edition and the second edition in 2021); "Therapeutic Guide of Veterinary Ophthalmology" (2015 Romanian, 2017 English and 2017 Turkish).

**CS:** When you examine a brachycephalic patient, using which criteria do you tell apart an animal who needs a surgical intervention and one who doesn't?

**Dr. Iuliana Ionascu:** I principally look for the signs of exophthalmia and medial entropion, or any other sign of a Brachycephalic Ocular Syndrome. The criteria I want to highlight is the following one: are these signs leading to a kind of trauma that can be solved only by surgery?

If the answer to that question is yes, it is what I highlight to the owners to justify the need of a surgery.

**CS:** Speaking about the owners, how do they generally react when you inform them that a surgery will be needed? Are they surprised or were they already aware that this might happen one day when they bought their brachycephalic animal?

**Dr. Iuliana Ionascu:** I observed that most owners were already aware that these breeds have special needs and might require surgery one day or another. I think it is a situation they accept quite easily thanks to the means of a good communication between us, the professionals, and them. I for example have a YouTube channel where I make available for free all kinds of information the owners might need to know.

I also think a good communication is primordial within the veterinary community itself. For instance, whenever I see a brachycephalic patient for ocular issues, I make sure the other BOAS-related abnormalities are checked as well by the doctors who are usually taking care of them, such as Dr. Seralp Uzun with BOAS surgeries.

**CS: Among the ophthalmologic surgeries you are performing, how many of them would you say are related to a BOS?**

**Dr. Iuliana Ionascu:** We have approximately 4000 cases per year in the ophthalmologic department. Among them, we currently perform the medial canthoplasty surgery in brachycephalic dogs and cats about 50 times per year. But apart from them, we also treat about 500 brachycephalic patients suffering from other BOS-linked abnormalities, such as corneal ulcer, and we perform other surgeries on them like the tarsorrhaphy or the conjunctival flap. But it is like a fashion cycle: depending on the trending breed to have, we commonly have to take care of certain types of ophthalmologic surgeries.

About 20 years ago we were dealing a lot with the entropion in Rottweilers because back then it was the trend to have this breed who suffered a lot from this congenital anatomical defect of the eyelid rolling inwards. Then, we had to deal with the same issue in Shar Pei dogs. Now, a lot of our ophthalmologic surgeries revolve around the brachycephalic breeds, either dogs or cats, including the medial canthoplasty to correct their exophthalmia and its resulting issues.

And there is something interesting that I noticed: we are still often performing the entropion surgery nowadays, but now it is mostly in cats rather than dogs.

**CS: Last February, Norway decided to ban the selective breeding of Cavalier King Charles and British bulldogs. What is your opinion on that ?**

**Dr. Iuliana Ionascu:** I think it is a very good and wise decision. It is wonderful ! Hyper-type animals such as brachycephalic dogs and cats are constantly suffering and it doesn't correspond to my idea of animal welfare. When I hear them having difficulties breathing, I feel like I am suffocating too and it is awful.

**CS: Is there a case that you remember in particular (owners moving you, case with an initial difficult prognosis, etc.) ?**

**Dr. Iuliana Ionascu:** I personally remember Noir, a 6 years old French Bulldog, who had a small tumor on his palpebral conjunctiva. It was possible to remove it only requiring a small amount of local anesthesia, but to increase his comfort I chose to go to surgery under general anesthesia. During the surgery, he became cyanotic, his heart stopped, and he had difficulties breathing with a kind of hiccup. I inspected his throat and saw there was a piece of biscuit stuck in his trachea ! After removing it he recovered a normal respiration and we finished the surgery normally. 6 years later, his owner sent me a message to thank me again, telling me that Noir is still alive today thanks to me.

March 2022

**CS: Do you have any particular advice to give to future vets and young doctors about approaching Brachycephalic Ocular Syndrome cases ? Something they might not find in books ?**

**Dr. Iuliana Ionascu:** There are a lot of things you can't find in books so far. I would advise them to follow veterinary practitioners who are already performing ophthalmologic surgeries, and to not be afraid to try practicing by themselves whenever they can.



Fig 7- Credit: Conf. univ. Dr. Iuliana Ionascu

### • Conclusion

Owning a brachycephalic animal is not bad in itself, and as veterinary practitioners and students we should always avoid falling into the trap of blaming the owners. Instead, a good communication and prevention are the key for a positive evolution of these animals' situation on a long term basis.

It is important to highlight that the protruding eyes and other exaggerated features of the brachycephalic dogs and cats are the anatomical characteristics that should be avoided and corrected in the future, and we should encourage people to avoid hyper-typed pets.

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# CARDIOLOGIC PROBLEMS IN BRACHYCEPHALIC BREEDS

*Interview with Dr. Beatrice Cristescu  
by Miruna Beda*

*Whether you own a lovely Frenchie like the one showcased on our faculty's banners or you're simply a veterinary student, you're certainly no stranger to the Brachycephalic Obstructive Airway Syndrome and what it means for our four legged friends.*

*Still, do you truly know all that it entails? How severe and invasive it can be for the other systems of the body aside from the respiratory airways?*

*In the article below, we'll cover the cardiologic problems that arise in these breeds with the help of Veterinary Dr. Cristescu Beatrice, specialized in Cardiology here at University Hospital "Profesor Dr Alin Birtoiu".*

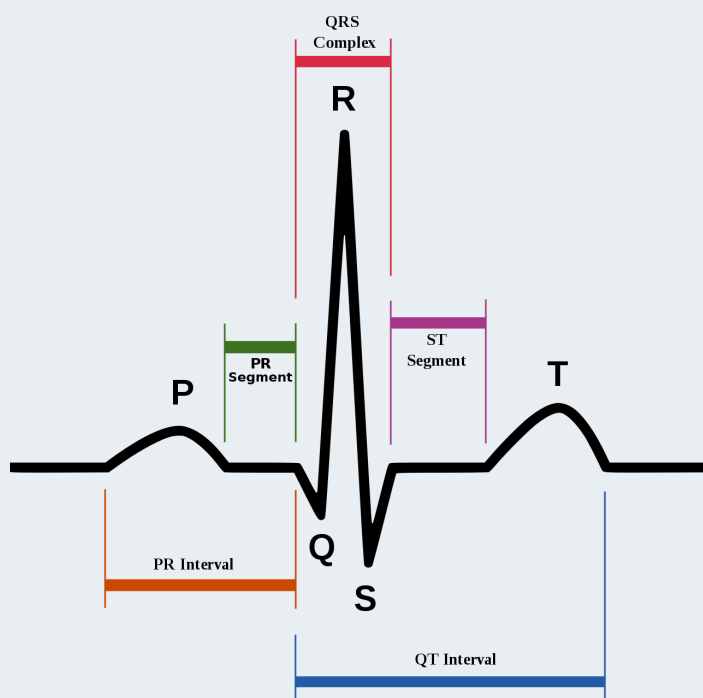


Fig 1: the basic ECG waves and intervals (source: PR Interval Wikipedia)



Dr. Beatrice Cristescu graduated from the University Of Agronomic Sciences and Veterinary Medicine of Bucharest in 1999 and continued her academic pursuit by getting a postgraduate degree in Veterinary Clinic and Pharmacy, obtaining the

professional qualification of primary veterinary doctor 12 years later. Over the following years, she gained under her belt a bunch of specialty courses, such as Cardiology Training Course under Prof. Dr. Károly Vörös from University of Veterinary Medicine Budapest, ecocardiography classes levels basic, advanced and intermediate under June Boon from Colorado State

**MB:** To start off, what are the most frequent cardiologic issues that brachycephalic and BOAS patients suffer from?

**Dr. Beatrice Cristescu:** Heart problems are strongly interdependent and correlated with respiratory issues. What's defining in all this is the age the patient has when you identify the primary respiratory issue alongside the secondary cardiac one: young patients don't show significant clinical or paraclinical signs.

When it comes to them, what we do notice is the exacerbation of the vagal tone correlated with chronic respiratory problems. This fact will reflect on the depolarization of the sinoatrial node. Thus, on the electrocardiogram we will notice pronounced respiratory sinus arrhythmia and sometimes the presence of a wandering pacemaker or an extended PR interval, directly correlated with the sinus bradycardia.

**Wandering Atrial Pacemaker (WAP)**

Fig 2: ECG aspect of a wandering pacemaker



Fig 3: ECG aspect of an extended PR interval

Generally speaking, the presence of cardiac lesions in young brachycephalics isn't more prevalent compared with animals presenting dolichocephalic or mesocephalic skulls.

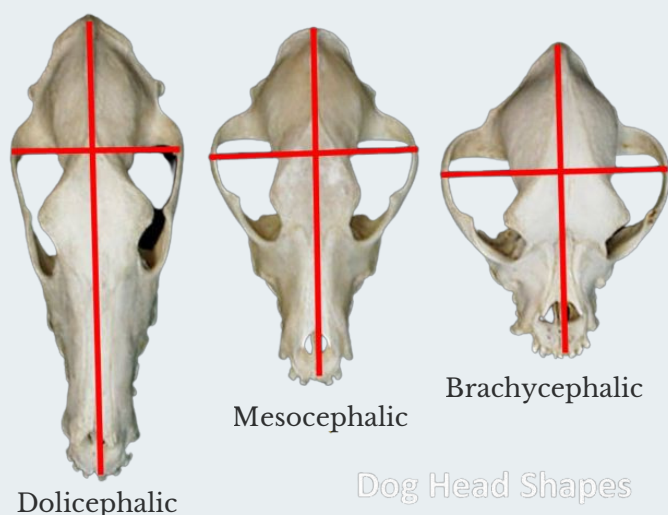


Fig 5: Source: Psychological Enterprises Ltd

In brachycephalic patients that also manifest chronic BOAS, we can detect the presence of electrocardiographic and echocardiographic alterations: sinus arrest, pulmonary hypertension and right ventricular remodeling, generating the pathology known as "cor pulmonale".

**MB:** Why do these cardiologic problems arise? What's the starting point of this degenerative cascade?

**Dr. Beatrice Cristescu:** Hypoxia produces strong vasoconstriction. The consequence is represented by a rise in the pulmonary arterial pressure and vascular resistance, which in turn result in vascular changes such as proliferation, fibrosis and inflammation. These lead to the apparition of pulmonary hypertension.

**M.B:** What are some tell-tale cardiac signs owners of pets with BOAS should watch out for?

**Dr. Beatrice Cristescu:** The symptoms are of a cardiovascular origin, correlated with the autonomous nervous system. These breeds present an increased vagal tone, vasovagal stimulation causing the apparition of syncope, or simply said, fainting. Hyperactive patients showcase polypnea and mucosal hyperemia, alongside the exacerbation of respiratory failure, sometimes these signs leading to hypoxia and cyanosis. The air mass that circulates in the airways is turbulent. It generates, especially in the presence of tachypnea and high environmental temperatures, inflammation of the airways and the apparition of non-cardiogenic pulmonary edema, sometimes with fulminant evolution.

**M.B:** How do you do a pre-surgery consultation for a BOAS patient? How does it differ from a regular patient?

**Dr. Beatrice Cristescu:** A preoperative, or better said, pre-anesthesia cardiology consultation is, in fact, the same as any other cardiology consultation, such as periodic screening or a consultation specifically addressed for adjusting a cardiotrope therapy. It targets clinical consultation, measuring the patient's blood pressure, electrocardiography (ECG) and echocardiography. Each of these steps offers unique and valuable information, which can be synthesized in a conclusion which then leads to treatment and/or the possibility of going under anesthesia.

The difference is represented by the morphological and physiological peculiarities these breeds have. Brachycephalic individuals are two times more exposed to hyperthermia. That's why we opt for morning visits when it's the warm season. This way, we avoid stress, tiredness and restlessness, these factors exhausting the patient and exposing him or her to the risk of syncope, cyanosis and collapse.

**MB:** How many times did you discover patients that weren't able to go through with their surgeries because of cardiac issues?

**Dr. Beatrice Cristescu:** Actually, not too often. Usually, owners are disturbed by the noises their furry friend makes. On the one hand, they realize their pet suffers every breath it takes, on the other hand, they are directly affected acoustically speaking.

Therefore, they wish to increase the animal's respiratory comfort and generally end up in a preliminary cardiology consultation before the apparition of pulmonary hypertension signs. Still, there have been some cases in which the severe arrhythmia or the presence of cardiac lesions made the anesthesia, and implicitly, the surgery, impossible.



Fig. 6: BOAS patient while echocardiographic exam. Credit: FMVB Cardiology department

**MB:** Out of all brachycephalic breeds, which ones do you find to have fewer respiratory and cardiac problems? And which one almost always has them?

**Dr. Beatrice Cristescu:** Liable breeds can be small, such as the Pekingese, Shih Tzu, French Bulldog, Pug, medium sized: the King Charles Spaniel or big (Boxers, Mastiffs and Bulldogs). Each category can showcase more or less pronounced morphological alterations when it comes to their upper respiratory airways, depending on the genetic configuration obtained from coupling the ascendants. However, I did notice Pugs and Frenchies to be most frequently affected, as they're also the most common brachycephalic breeds from the last few years.

**MB:** When talking about BOAS, dogs are the ones that come to mind, although this syndrome happens in cats too. Are brachycephalic cats healthier than dogs? Are they affected differently cardiologically speaking?

**Dr. Beatrice Cristescu:** I can't say they're healthier than dogs. Although these two species bear striking differences when it comes to their behavior and physiology, the lesional problems that can be found in their respiratory airways and heart are identical. Obesity control, prevention or the control of associated bronchopulmonary diseases as well as surgical correction are advised.

**MB:** Having seen the multiple issues these breeds suffer from, especially considering your specialty would you ever consider owning such a pet?

**Dr. Beatrice Cristescu:** They have a wonderful temperament and they're also excellent companions and playmates for kids. Yet, their ongoing respiratory problems, aggravation and even possibility of quick decompensation must be considered when deciding to adopt such a pet.

**MB:** What can owners of brachycephalic pets do to help prevent future cardiac issues?

**Dr. Beatrice Cristescu:** They should book an appointment for a respiratory evaluation immediately after purchasing a puppy or kitty of the affected breeds and, in time, they will be monitored and periodically evaluated by their veterinary doctor. A precocious surgical intervention offers quality of life to our brachycephalic four-legged friends and prevents the apparition of cardiac complications generated by chronic hypoxia.

Cardiac evaluation, in correlation with the presence of BOAS, should be done as soon as this syndrome is discovered.

In case of obstructive syndrome, the patient's complete evaluation, focused on the presence of structural respiratory alterations and the secondary cardiac ones represents the first step. The treatment of infectious and inflammatory type respiratory afflictions (if associated) is another important step. All these target the realization of surgical correction in the best and safest conditions possible for the pet.

**MB:**How often should owners come with their pets for a cardio check?

**Dr. Beatrice Cristescu:** This question entertains a simple and yet complicated answer...it depends! Generally speaking, I recommend a cardio check right after acquiring the little furry friend. Besides, the puppy or kitty should get acquainted with the stethoscope and vaccines regardless of the specialized cardiology consultation. Precocious detection of heart murmurs can save many lives.

As follow-up, cardio checks can be done yearly. As associated pathology starts manifesting (respiratory, ophthalmological, renal, endocrine, oncological etc.), the cardio check is repeated at shorter intervals, ensuring the prevention and treatment of complications with the help of specific therapy.

To conclude, as you've probably already known or do now after reading all this information, cardiologic investigations and the circulatory system have a pivotal role in your pet's wellbeing, especially if they belong to one of these pretty sensitive breeds.

If you own such a cat or dog, show them extra care and always err on the side of caution. In the long run, it can truly save your fluffy baby's life!

# BOAS AND OUR FACULTY EMERGENCY HOSPITAL

*Interview with Dr. Seralp Uzun  
by Mara Catalina Busca*



*As the time passes we see a lot more of brachycephalic obstructive airway syndrome not only because all the dogs suffer from it but because brachycephalic dogs became the favorite breed for owners so their number has increased massively in the last 15 years.*

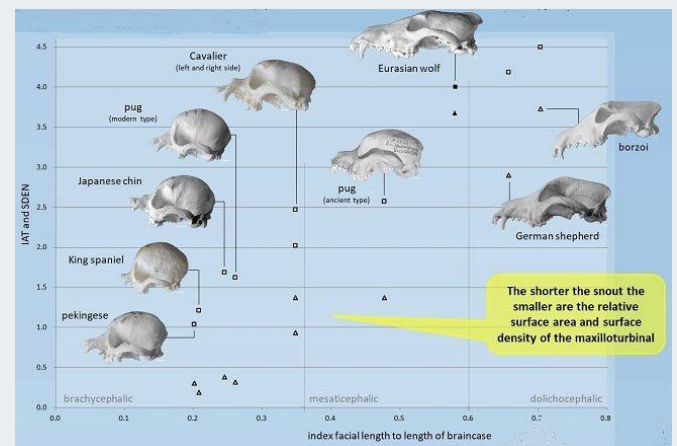
*A recent study made by reassessors at Eötvös Loránd University in Budapest, Hungary highlighted that people bonded easier with brachycephalic dogs breed and that has to do with the way these dogs look at humans which may make them appears more social and easier to interact with, they also tend to make a better eye contact.*

*If you've never heard about the term "brachycephalic dogs" it can leave a bad impression and you may think it refers to some kind of disease. However, the truth is that this denotation applies to some of the most popular and well-loved dogs.*



Brachycephalic literally means "short-headed" and it refers to dogs with flatter faces and short muzzles, like Pug, Bulldog, Frenchie, Pekingese, Boxer, Cavalier king Charles, Spaniels, Shih Tzus, Mastiffs, Cane Corso, Griffon Bruxellois, Japanese Chin, Rottweiler, Valey, Bulldog, Dogue De Bordeaux, Boston Terrier, Chow Chow and many others.

If one of your lovely babies is a Brachycephalic dog, you probably know something about BOAS caused by their unique internal skull structures that make these breeds different and if you don't, we suggest you to read forward or skip till page...



Brachycephalic Obstructive Airway Syndrome is a complex group of conditions seen in dogs that are bred to have short noses and different/strange/unusual/dissimilar/distinct/individual skull structures. BOAS is also referred to as brachycephalic airway disease (BAD) and brachycephalic airway syndrome (BAS).

Therefore they have an excess soft tissue in the upper airways that obstructs airflow and drive the animal to breathe with the mouth open.

Furthermore there are some specific parts that are affected like the opening of the nostrils that can be narrow or completely closed (stenotic nares). Also the soft palate (which is situated at the back of the mouth) may be elongated and get stuck into larynx when the dog breathes in. In these breeds the soft palate can be up five times the thickness than a normal breed. Sometimes the tonsils (the lumps of tissue situated on both sides of the back of the throat) and the larynx can get inflamed and they can contribute to airway obstruction (everted laryngeal sacculles = a condition in which tissue in front of the vocal cords is pulled into the trachea and obstructs airflow).



Too often, owners find themselves leaving doctor's office with a lot of question going to their mind and that's why we are here. To ask the right questions and to provide the information that might have skipped. For this reason I knocked the surgery department's door to talk with

Dr. Seralp Uzun about BOAS and our Emergency Hospital's program.

Senior Lecturer Dr. Uzun graduated from Istanbul University Veterinary Medicine Faculty in 1998. In 2016 he found the Turkish Veterinary Emergency & Critical Care Association. In 2019 he published the first Turkish Veterinary Emergency book. At the same year he became committee member in EVECCS (European Veterinary Emergency & Critical Care Society) He is an international speaker in Emergency Surgeries and been invited in several congresses and Universities in Argentina, Colombia, Egypt, Estonia, Turkey, Latvia and Czechia. Currently he is teaching Propedeutics and Surgery in our faculty English Sections.

Dr. Uzun will help us with all the question that you may think off.

**MCB: What can be done for BOAS at University Emergency Hospital "Prof. Dr. Alin Birtoiu"? / How can University Emergency Hospital "Prof. Dr. Alin Birtoiu" help my pet?**

**Dr. Seralp Uzun:** Everything! Here in our hospital we are capable to do all surgeries. Two years before we started a program that focused on those breeds. We published some informative brochures for the brachycephalic dog owners and we started to invite the owners to BOAS examinations.

**MCB: Can you please open this more and also how you diagnose BOAS?**

**Dr. Seralp Uzun:** Sure. So according to this program each brachycephalic patients having a special examination. First I make a general examination. With the stethoscope we listen upper airways, laryngeal sounds and we note all the findings and vitals. After that we have a small effort test. I am walking with the dog 3 mins. But this is not a slow walking. You do not let the dog distract by other things and start a fast walking. While walking we listen the breathing sounds, how the patient handles walking. After this test we re-check the vitals.

For example the body temperature rises up very fast in brachycephalic patients. With all this clinical findings we grade the BOAS. Grading is from 0 to III;

Grade 0 patients are clinically unaffected. Free of respiratory signs. But we suggest re-check 8 to 12 months if the dog is under 2 yrs.

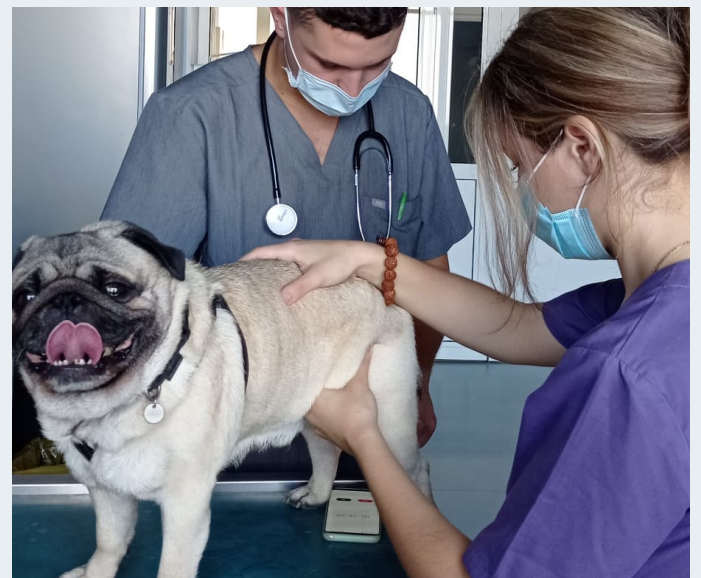
Patients represent, Grade I are mild effected. Those even having mild respiratory signs, tolerate the exercise. Even though, they must be rechecked in 6 months. Grade II patients are Clinically affected. The dog has a clinically relevant respiratory signs and requires management Weight loss and surgical intervention. But when it comes to Grade III, we definitely recommend the surgery.



*Fig. 3: BOAS patient while before effort test, listening the respiratory noises while resting. Credit: FMVB Surgery department*

**MCB: How you differentiate the grades?**

**Dr. Seralp Uzun:** Well, In this effort test if the patient have mild to moderate stertor as respiratory noise with inspiratory effort from not present to moderate and without dyspnea, cyanosis, syncope than you grade your patient as GII. Patients with moderate to severe stertor and/or any stridor and also having moderate to severe inspiratory effort than they are GIII. It is not necessary them to have dyspnea. They may or may not present cyanosis. But definately shows inability to exercise. Of course the effort test mainly stops in the second minute not to force them. After this we also evaluate the nares.



*Fig. 4: BOAS patient after effort test, recording the vitals with 4th year vet.med. students. Credit: FMVB Surgery department*

### MCB: How is BOAS treated?

**Dr. Seralp Uzun:** We all must agree as veterinary doctors that, surgeries CANNOT cure BOAS. But instead reduces further problems.

After the examination we talk with the patient owners and make surgical plan. But of course we do not go to BOAS surgeries right away. As you can appreciate those patients must have cardiologic examination and if necessary Dr. Catalin Micșa performs endoscopic examination right before the surgery



*Fig. 5: While Dr. Catalin Micșa performing endoscopic examination to BOAS patient. In picture right to left: Dr. Catalin Micșa, Dr. Seralp Uzun, Dr. Alexandra Peteoaca, Dr. Maria Roxana Turcu, Dr. Ruxandra Pavel . Credit: FMVB Surgery department*

At last if everything is fine, we enter to the surgery. Generally we perform Rhinoplasty and soft palate resection surgeries in the routine. Last year we performed approximately fifty BOAS surgeries.

About treatment and post op period, it is highly important to work with patient owners in colobration. Because those patients obviously need to have weight control program.

### MCB: Is there any complication that can appear during the surgery that the owners should know?

**Dr. Seralp Uzun:** As in all surgeries, BOAS surgeries can also have risks. One of the major concern is hemorrhage. Those breeds prone to be bradycardy and Dr. Beatrice Cristescu makes detailed cardiologic exam before the surgery and after we are having short brief with cardiology and anesthesiologist doctors.

Post-op is definately important. In the past for the soft palate resections, I was also using laser due to perform this surgery with laser is way more faster. But couple years before many articles published and I personally also absorbed after the surgeries via laser, severe edema occurs. For this reason I prefer classic fashion. Besides I highly recommend not to use electrocautery in those surgeries.

### MCB: What other surgeries can be performed in our emergency hospital related with BOAS

**Dr. Seralp Uzun:** Sacculectomy. Because eversion of the laryngeal saccules is considered the first stage of laryngeal collapse. With endoscopy and while intubation of the patient if we confirm there is eversion, we also perform this surgery.

The other surgery is tonsillectomy. But tonsillectomy is not routinely done because excision is unnecessary for a good improvement and may increase local inflammation postoperatively and also published reports declares tonsillectomy has little to no benefit. For this reason tonsillectomy is not recommended. Laryngeal paralysis and tracheal collapse surgeries can also be performed in emergency situations.



*Fig. 6: Rhinoplasty surgery, Left up before and left down after the surgery pictures. soft palate resection (Staphylectomy). Right up before the surgery elongated soft palate and right down after the surgery in the same patient Credit: FMVB Surgery department*

### MCB: After the surgery, how long those patients should be hospitalized?

**Dr. Seralp Uzun:** If it is a routine BOAS surgery we do not hospitalize them over the night. Once they recover from anesthesia, and after our anaesthesiologist doctors and ICU doctors examination, we discharge them home.

Why? Because those breeds get very fast agitated when they are away from the owners. This agitation mostly causes hyperventilation and hyperthermia. They must rest and relax in their own home.

**MCB: Does BOAS gets worse with the age?**

**Dr. Seralp Uzun:** Unfortunately yes. To understand this, I can basically tell you that, BOAS shows itself with primary and secondary changes. Primary abnormalities that those breeds knowludging are stenotic nares, elongated soft palate and hypoplastic trachea.

Secondary abnormalities are everted laryngeal sacculles, everted tonsils, soft palate edema, laryngeal paralysis and finally tracheal collapse. The aim of primary BOAS surgeries are to prevent from secondary changes. Because if the primary changes won't be corrected via surgery, with the age secondary changes will be more obvious and can be life threatening.



*Fig. 7: Pug patient Marco getting prepared for BOAS surgery. In the picture anaesthesiology doctor Dr. Ruxandra Pavel. Behind the window, 5th year students in their clinical rotation to see the surgery Credit: FMVB Surgery department*

**MCB: What is the right time for BOAS surgery?**

**Dr. Seralp Uzun:** Based on knowledge and my experience, I can say after eight months old until two years old, BOAS patients should have surgeries regarding the primary changes.

**MCB: Have you ever saw grade 0 patient?**

**Dr. Seralp Uzun:** Once yes. Oh I can never forget that French Bulldog. After we started the BOAS program, an owner who came to our hospital for a routine check-up asked if I can also examine for BOAS grading for her two years old Frenchie. On the physical examination everything seemed good to me. I took the patient for effort test. Instead of walking, she was running in the effort test, Saturation level was obviously fine, no respiratory noises nor inspiratory effort observed. Even after 3 minutes of effort test, she wanted to continue running happily. I went back to the owner and said "Maybe we should give Lilly a medal" It was happy momment. I advised annually re-check.

March 2022

**MCB: We know that you like trauma and emergencies. Why brachycephalic patients and BOAS surgeries?**

**Dr. Seralp Uzun:** In my professional career, I am affected by two things mostly. To see and feel the patient owners in emergency situations. Because they feel desperate and you can read this from their faces and the brachycephalic dogs in the waiting room with respiratory noises. Because they are suffocating and whenever I hear or see them in this condition, I empathize and I feel like I am not breathing.

Think about this. They are not cute as internet manuplates us. They are just miserable breeds. You can read from their faces. This is heart breaking and as a veterinary surgeon you must do something. But not only as a veterinary doctor, as a human being we all must do something about their wellbeing.

**Conclusion:**

While it is important that you exercise your dog regularly and keep him/her fit, it is also important to rember that brachycephalic dogs, particularly BOAS-affected dogs may have some difficulty egulating their body temperature. It's better for them to avoid hot summer days actually in general it is best to keep your dog away from hot enviroments or situations that may cause stress or too much excitement. Keep them cool on this days or walk near water so they can cool down easily.

Every day, here at the **University Emergency Hospital "Prof. Dr. Alin Birtoiu"**, we see dogs diagnosed with this syndrome and some of them are already in a life-threatening condition such as collapse because BOAS is not well understood by the owners.

So in the attention of Brachycephalic pet owners we made this article to consider early diagnosis and intervention before your dog has developed life-threatening secondary complications. And even if your dog has no symptoms an appointment with their doctor is more then welcomed because their were teached to treat all patients to the best of their abilities. It is therefore our belief that we have a duty to help any animal so they can live a pain-free and healthy life.

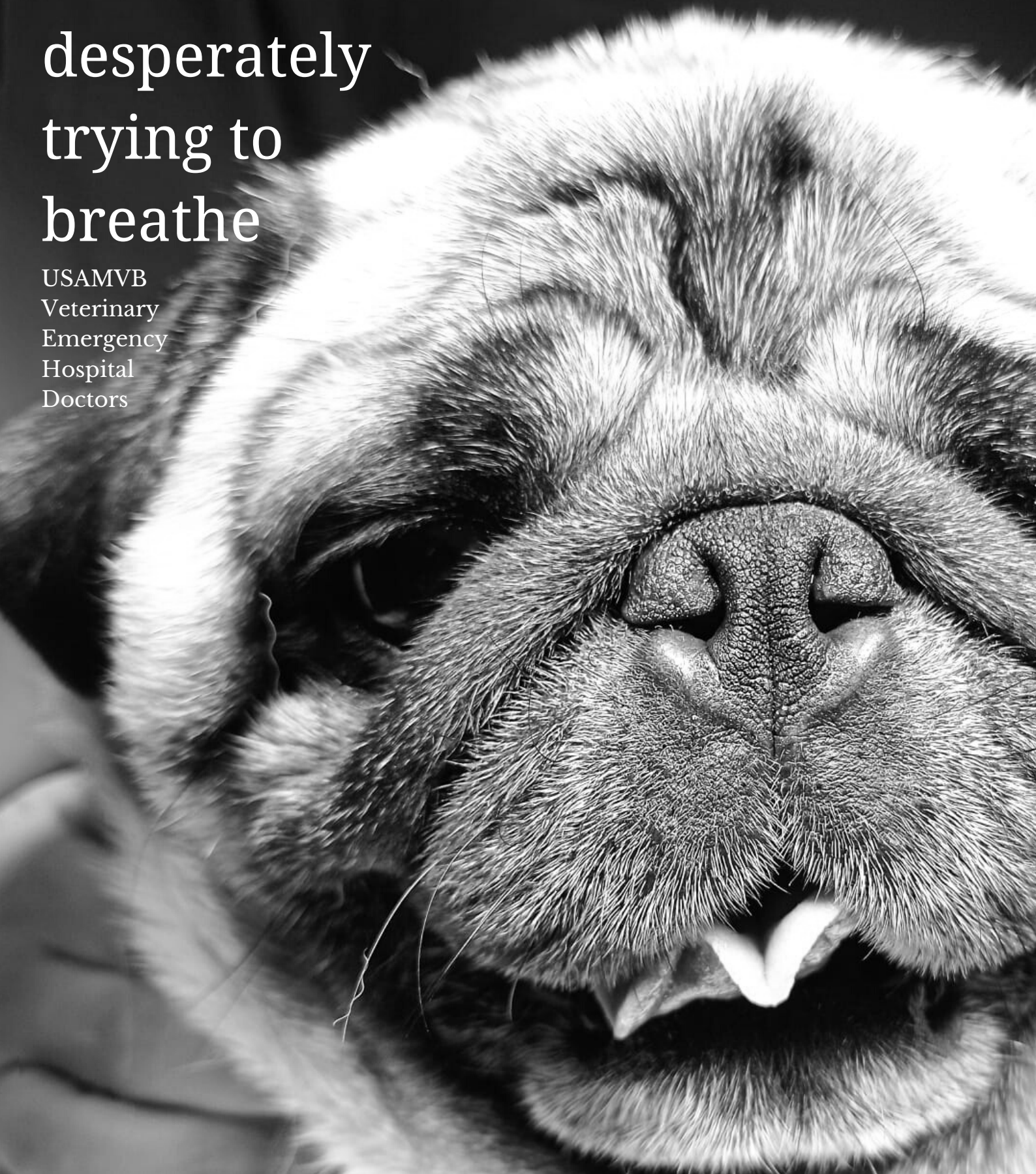
We also feel is is very important than when you decide to buy a fur friend to completely understand and educate yourself on the genetic and medical condition of your chosen breed because that's what will lead you to an educated and informed decision.

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For sure the most  
heartbreaking thing  
is to see them  
desperately  
trying to  
breathe

USAMVB  
Veterinary  
Emergency  
Hospital  
Doctors





# INTRANASAL OXYGENATION IN BOAS PATIENTS AND OTHER SUPPLEMENTAL OXYGEN TECHNIQUES

by Petre Ciprian Dragomir

*Oxygen therapy is a treatment that delivers oxygen gas into the lungs. This treatment increases the amount of oxygen the lungs receive and deliver to your blood.*

*In emergency, the most efficient way of delivering supplemental oxygen via intranasal prognos. But are brachycephalic breeds tolerate this procedure? Do we have other options?*

*In this article we will focus on this important situation*  
In human medicine, oxygen therapy is mainly used as a treatment in carbon monoxide poisoning gangrene, stubborn wounds, and infections in which tissues are starved for oxygen.

In the veterinary practice, the need for oxygen treatment is mostly used in respiratory distress, with a large volume of abdominal effusion or metabolic acidosis. It is also required in heart failures and pulmonary fibrosis.

Several methods are used in providing pure oxygen into the lungs of our patients.

The easiest one is the “flow by” technique. In this case, it is required to only hold the oxygen tube close to the face of the animal. (Approximately 3 to 5cm distance from the nose. Unfortunately, it does not reach it’s full potential due to the oxygen is also spreading all around, and sometimes it can be insufficient. Also providing oxygen with this technique, can be impractical and it is not well tolerated by some patients with the risk of leading to anxiety.

Even though, this simple technique have some advantages like patients need oxygen while placing the catheters or sometimes in rX and USG examinations which are that are non-negligible.



*Fig. 1: Providing supplemental oxygen via flow-by technique while placing IV catheter. Credit: FMVB Surgery department*

## Highlights for flow-by technique

- Good alternative for the patients do not tolerate mask.
- Short term oxygenation.
- 3-5 cm distance to nose and mouth.
- Brachycephalic breeds and cats before IV catheterization 5 mins before radiography.
- Less effective than other techniques.
- As a principle flow rate : 3-5 lt/min.
- FiO<sub>2</sub> : 40-50%

Another simple technique you can provide supplemental oxygen is via mask.



*Fig. 2: Providing supplemental oxygen via mask.  
Credit: FMVB Surgery department*

### Highlights for mask technique

- Easiest way for to provide the urgent need of Oxygen
- Effective in short term needs.
- Brachycephalic breeds and high anxiety patients may not tolerate
- Cats, may or may not tolerate the mask. As we all say cats are cats.
- As a principle flow rate : 2-5 lt/min.
- FiO<sub>2</sub> : 40-50%

A convenient method, especially for cats and small dogs is the oxygen cage. As in the picture below, it is a cage made of most of the polyvinyl chloride and acrylic glass boxes. When such a cage is used, we have to pay attention to the temperature, the humidity level, and the ventilation. On the market, there can be found oxygen cages that have the capability of measuring those factors and can also come with a soda-lime system, to prevent rebreathing of the carbon dioxide. Of course, unfortunately, they have a bigger price tag.



*Fig. 3: Dog in oxygen cage Source: Clinician's brief*

The other problem about oxygen cages or oxygen tents is that oxygen concentration in the cage/tent drops dramatically fast when you need to do some medications, injections to your patient and you open the door of the cage and it takes time to recover the oxygen concentration in the cage.

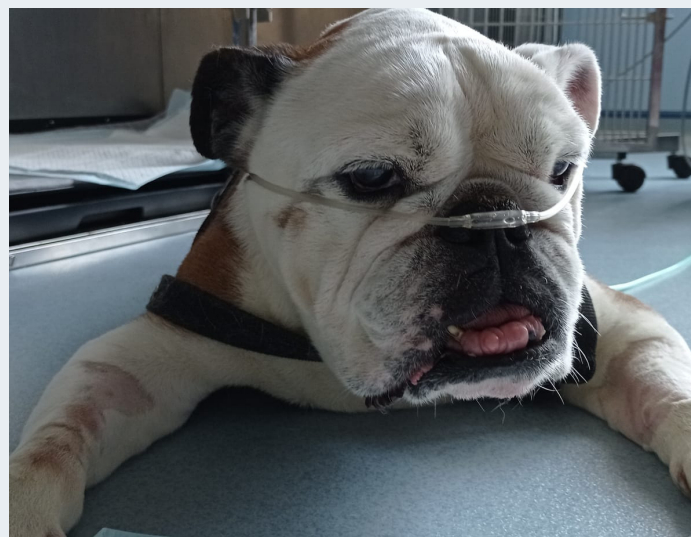
But if you do not have enough money to buy oxygen cabin or tent, do not worry. You can also make an oxygen cage by covering the cage doors with stretch kitchen films which will help you and your patient in short term.



*Fig. 4: Demonstrative picture for supplemental oxygen techniques by covering the cage doors with stretch kitchen film  
Credit: FMVB Surgery department*

### What about intranasal oxygenation?

The intranasal oxygenation is performed with the help of a Nasal cannula. The two types of nasal cannulas are low flow and high flow. The device has two prongs and sits below the nose. The two prongs deliver oxygen directly into the nostrils.



*Fig. 5: Brachycephalic patient receiving supplemental oxygen via intranasal prongs. Credit: FMVB Surgery department & USAMVB Emergency Hospital ICU unit*

The biggest advantage of providing supplemental oxygen is you can deliver the oxygen with high flow rates.

But you must take care that oxygen must be humidified.

As I mentioned, instead of nasal prongs you also can use nasal canulas.



Fig. 6: Needs for intranasal oxygenation procedure  
Source: *Veterinary emergency & critical care procedures guide*  
Dr. Seralp Uzun/2019

### What you need?

- Marker pen
- Lidocaine gel or spray
- 1/0 suture material
- 18G needle
- Intranasal oxygenation tube
- Connector

### Step by step the procedure:



Fig. 7: Credit: FMVB Surgery department

Measure the tube from nasal fold to median canthus of the eye and sign with marker pen



Fig. 8: Credit: FMVB Surgery department



Fig. 9: Credit: FMVB Surgery department

Put some gel on tip of the tube for easy introducing

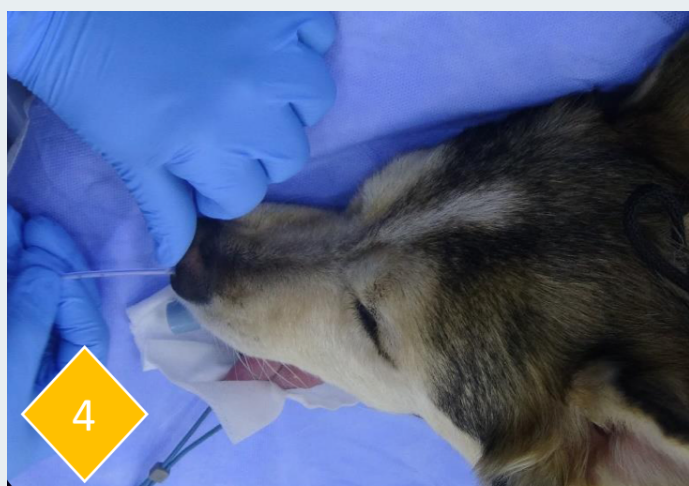


Fig. 10: Credit: FMVB Surgery department

Lift up the nasal fold and introduce the tube



Fig. 11: Credit: FMVB Surgery department

Place the sutures with the help of 18G needles. After placing the sutures on the skin, connect the tube to oxygen source via christmas tree connector.



Alternatively to sutures you can also use adhesive tape and glue them on the skin after clipping the fur



Fig. 12: Nasal oxygenation tube placement with adhesive tape and glue. Source: Veterinary Emergency and Critical Care Procedures Guide. Dr. Seralp Uzun/ 2019

#### Highlights for intra-nasal oxygenation:

- Most elegant and efficient way of providing Oxygen.
- High oxygen flow.
- Vet practitioner must take care of mucosal harms.
- As a principle flow rate : 50-100 ml per kg/min
- FiO<sub>2</sub> : 30-50%



Fig. 13: French bulldog, receiving supplemental oxygen in the ICU unit. Credit: FMVB Surgery department

#### Contraindications:

Intra-nasal oxygenation procedure is contraindicated for;

- Patients with high intracranial pressure
- Head trauma
- Thrombocytopenia
- Platelets dysfunction
- Intranasal hemorrhage (epistaxis)

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**“IT’S JUST THE MOST  
AMAZING THING TO LOVE A  
DOG, ISN’T IT?  
IT MAKES OUR  
RELATIONSHIPS WITH  
PEOPLE SEEM AS BORING  
AS A BOWL OF OATMEAL”**

John Grogan



THE  CAMPUS

# WHAT OWNERS SAID AFTER BOAS SURGERIES?

by Maria Nestian



*We love all dogs, no matter the breed, age or fur color, but when we choose to adopt a specific breed it is best to research about their illnesses, character and needs so we can offer our four-legged friend the best life he can have!*

Some of brachycephalic owners do not know what B.O.A.S. means and don't know that the snoring that many find cute is, in fact, a warning that our dog is suffering.

Here you can read some happy ending stories about our B.O.A.S. patients from our University Veterinary Emergency Hospital



Taz and Valeri Sun Ostfeld



**MN: Why did you choose to have a brachycephalic dog? What breed did you choose?**

Valeri Sun Ostfeld: Actually I didn't choose him, he was for adoption from a guy that didn't know how to handle all of his problems, and I also really like this phenotype of dogs. I have a boxer at home (I'm not from Romania, but I study in FMVB) and I didn't want to have a large dog in a small apartment in Bucharest.

12 kg French Bulldog. He does not weigh that much, but he doesn't have the behavior of a small lap dog. He is very lovely and funny, full of good energy and fearless. His name is Taz like in the cartoon.

**MN: How did you find out he has B.O.A.S.?**

Valeri Sun Ostfeld: I knew it from the beginning. He is Brachycephalic and he is snoring. I didn't know it could be operated. I heard about it for the first time when Dr. Uzun started to talk about this kind of surgeries in our class.

**MN: Was it a tough decision for you to get Taz under surgery?**

Valeri Sun Ostfeld: It took me some time to decide. Mostly because I didn't want him to be at risk. But he had so many problems, for example he had sleep apnea, and he couldn't go into deep sleep, he used to hyperventilate for like 20-30 minutes after a short walk outside and to vomit/regurgitate almost every day. So I have finally decided that it is better for him to go under surgery.

**MN: How was the recovery after the surgery?**

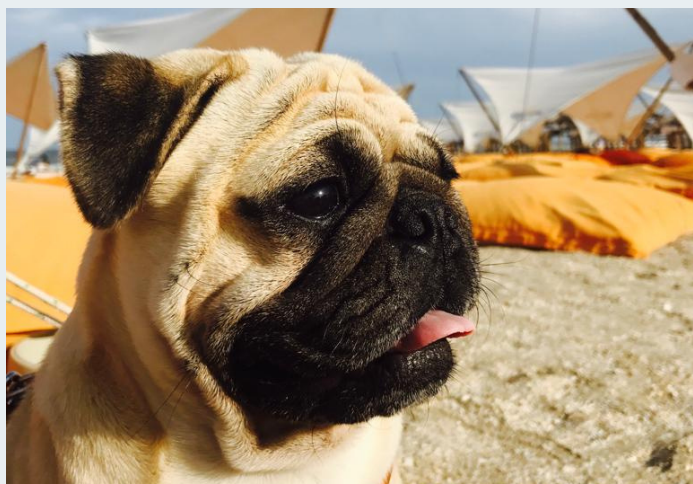
Valeri Sun Ostfeld: I was in his surgery due to my final thesis. The surgery was really life changing! I mean he will never be an agility dog, but he definitely has a better life quality now.

The real change started about 2-3 days post surgery when the surgical edema started to decrease he started to sleep way much better and be much more calm and relaxed.

It was very weird for me not to hear him snoring at night.



## Norbert and Gherghina Oana



**MN: Why did you choose to have a brachycephalic dog?**

Norbert is a 6 year old Pug. My son wanted him very much so now he is part of the family.

**MN: Did you know about his predisposition to specific illnesses beforehand?**

Oana Gherghina: Yes, but we hoped that he will be healthy. We have also decided that we will treat him the best we can.

**MN: How was to find out he has B.O.A.S. ?**

Oana Gherghina: It was hard for us to know he will need surgery, but we believed in University hospital doctors. Anesthesiology doctors informed us well, Dr. Uzun explained to us each steps clearly, what does the surgery mean. At the end, thanks to God and all the doctors involved before and after the surgery all went well.

**MN: After all this experience would you choose or adopt another brachycephalic dog?**

Oana Gherghina: For sure! They are adorable and they deserve to be loved. Even us, human beings are not perfect and this does not mean we don't need to be appreciated.

**MN: What do you love the most about Norbert?**

He is very expressive. We can look at him and know instantly when he is sad, happy, sleepy or he wants to play.

A few years ago, we were sleeping and there was an earthquake. I have instantly woke up and saw him sleeping. I thought that the bed was shaking because of his snoring, thinking that a dog must feel an earthquake and warn us. But it ended to be a real earthquake and Norbert was peacefully sleeping.

After the surgery, now he can enjoy more staying and playing in the outside.

To see him happy and his life quality obviously improved makes us peaceful.



## Scooby and Teodora Balan

**MN: Why you choose Scooby?**

Teodora Balan: Scooby is a French Bulldog that was gifted to me three years ago. I always wanted this breed.

I did some research about the breed and their medical issues, so I knew he may have a lot of problems and it would be hard to take care of them.



**MN: How did you know that something was not good with him?**

Teodora Balan: He was getting tired very fast, many days we were just walking not more than ten minutes. He was restless in the house and he could only sleep while he was sitting.

One day we went to University hospital due to his eye problems, after his eye consultation, Dr. Ionascu wanted us to talk with Dr. Uzun and examine his respiration problem.

**MN: How did you feel during his surgery?**

At first I was nervous but I relaxed after a while knowing that this is for his own good. I realized he is on good hands with huge team of doctors in the hospital. They all were knowing what they are doing. I am thankful to from cardiology to anesthesiology doctors. While I was waiting him downstairs, they all were informing me about ongoing surgery. When I saw Dr. Uzun smiling, I just felt, "ok we did the right thing".



Porci and Coroi Petre



**MN: Can you tell about Porci? How you decided to have him?**

Coroi Petre: Porci is a 5 years old French Bulldog. We went to a kennel to adopt a puppy. After talking to a breeder from there he suggested us to adopt him.

It was love at first sight. He started playing with us and since then we are a family. He was 4 years old then.

**MN: How was to find out he has B.O.A.S. ?**

Coroi Petre: Totally coincidence. One day he jumped from my arms and he twisted his leg. He started to limp. We went to the University emergency hospital.

While orthopaedic examination surgery department doctors told me about BOAS. Started to ask questions about how Porci breath? Does he have sleep apnea? And similar more. Of course all my answers were yes. That day I learned this pathology.

**MN: What happened next?**

Coroi Petre: Doctors were very nice and experienced. We talked about everything. Blood analysis done. Cardiology examination been performed. The surgery, Sorry the surgeries planned.

The next day, my little boy Porci went to surgery. Now his femoral head resected due to the injury and definitely breathing better. We gave him the name due to his snoring. But after the surgery, for one year we don't hear that sounds anymore.

**MN: Now that you know about this illness would you choose another brachycephalic dog?**

Coroi Petre: For sure! They are so lovable!



DOGS  
DO SPEAK, BUT  
ONLY TO THOSE  
WHO KNOW HOW  
TO LISTEN

- Orhan Pamuk-





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Nu trebuie să  
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până în ziua  
când intră  
pe ușa  
secției de  
urgență!

