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Dog Tips

The Nighttime Struggle Flat-Faced Dogs Endure

Dive into the hidden challenges that keep this popular dog breeds tossing and turning all night long.

Analysis by Dr. Karen Shaw Becker

STORY AT-A-GLANCE

- Recent study results deliver more bad news about the health of flat-faced (brachycephalic) dogs, especially French and English bulldogs and pugs — they require more naps during daylight hours because sleep apnea prevents them from sleeping well at night
- The study also revealed potential problems with learning in flat-faced breeds based on brain wave patterns during sleep; the researchers observed that the dogs may have retained the sleep pattern of puppyhood, similar to newborns who spend more time in REM sleep
- A 2023 study evaluated sleep-disordered breathing in dogs using a neckband originally designed for human sleep apnea studies; the results showed that flat-faced dogs have significantly more breathing problems during sleep than dogs with longer snouts
- Other research shows that brachys change the way they sleep to avoid airway obstruction, e.g., they may sit up, raise their chins, or sleep with a toy between their teeth to keep their airways open

It seems the bad news never ends when it comes to the wellbeing of **flat-faced (brachycephalic) breeds**. Thanks to a recent study by Hungarian researchers, we can add sleep problems to the list of the many health challenges faced by these lovely, hugely popular dogs.

The study results, published in the journal Brain Structure and Function,[1] show that flat-faced dogs sleep more "because their breed-specific sleep apnea increases daytime sleepiness, their REM sleep phase is longer than non-REM sleep, and their sleep EEG patterns show signs of white matter loss."[2]

One of the sad ironies here is that the large, round head of brachy breeds is the feature people love most about these dogs, and at the same time presents a significant threat to their health. The flattest of the flat-faced dogs, e.g., the French and English bulldogs and the pug, have shorter lives than other dogs (on average, 3 to 4 years shorter), and often don't even make it to adulthood. According to Phys.org:

> *"Even in their short lives, they suffer from many ailments and undergo surgery to correct musculoskeletal, eye and respiratory problems. The abnormal shortening of the skull is also associated with a distorted, rounded brain, but it is not yet known how this affects neural functioning."*[3]

Flat-Faced Dogs Nap to Catch Up on Sleep

For the study, researchers at Eötvös Loránd University in Budapest, Hungary, used an EEG to study the sleep of 92 family dogs.

"In the sleep lab, dogs spend about three hours with their owners," explains study co-author Anna Kis, of the HUN-REN Institute of Cognitive Neuroscience and Psychology. "As nothing exciting happens, the dogs fall asleep quickly. Meanwhile, we conduct the electrical potential generated by the brain activity with electrodes glued to their scalps.

We wanted to investigate whether flat-faced dogs sleep differently from other dogs, as they are known to suffer from oxygen deprivation due to respiratory problems and therefore have poorer quality sleep. We found that the flat-faced dogs slept more in the three hours given to them during the study. More daytime sleep is probably compensation for insufficient sleep at night."[4]

The dogs' EEG patterns also suggest potential problems with learning. Special attention is paid to the REM phase during sleep, which involves high frequency brain activity. Previous research has shown that the amplitude of beta and delta brain waves (measured via EEG) during REM sleep is associated with intelligence in humans and the ability to learn in dogs.

"In the present study," explains co-author Ivaylo Iotchev, "we found that brachycephalic dogs had decreased beta waves and increased delta compared to dogs with longer noses. The frequency of sleep spindles increased. This pattern has previously been associated with poorer learning in dogs and loss of white matter in humans.

There may be several reasons for our results. The most interesting of these is that it seems as if the flat-faced dogs have retained the sleep pattern of puppyhood, similar to newborns who spend more time in REM sleep."[5]

Enikő Kubinyi, professor and head of the MTA-ELTE Lendület "Momentum" Companion Animal Research Group and ELTE NAP Canine Brain Research Group adds:

"They have large heads and eyes, high foreheads and small noses because we humans find these traits irresistibly attractive. That's how babies get us to care for them. It is possible that the selection of dogs to be infant-like in appearance has also infantilized their brain function.

But this is a bold assumption for now. What is very likely, however, is that breeding for brachycephalic heads leads to potentially harmful changes in brain function."[6]

Earlier Research on Sleep Problems in Brachys

In a 2023 study conducted by researchers at the University of Helsinki, a neckband designed to diagnose sleep apnea in humans was used with dogs with suspected sleep-disordered breathing.[7] As with the research described above, the 2023 study results revealed that breathing problems during sleep are considerably more common in dogs with flat faces and short muzzles than dogs with longer snouts.

Paul McGreevy, professor of Animal Behaviour and Animal Welfare Science, University of Sydney, and veterinarian Anne Fawcett, a lecturer at the University of Sydney, co-authored an article on the suffering of flat-faced dogs for online publication The Conversation. In the article, they discuss in heart wrenching detail the daily struggle many flat-faced dogs — especially those with extreme brachycephaly — endure.

The most significant of these is BOAS (brachycephalic obstructive airway syndrome), which occurs "because the nose, tongue, soft palate and teeth are crammed into a relatively small space, reducing the size of the airway."[8] With regard to sleep disturbances, McGreevy and Fawcett write:

> *"Affected dogs also change the way they sleep to avoid airway obstruction, sometimes by adopting a sitting position. They also raise their chins or sleep with a toy between their teeth to keep their airways open. Indeed, 10% can sleep only with an open mouth."*

Study Says: Brachys Snore More, Suffer More Sleep Apnea

In the 2023 study, researchers found that brachycephalic dogs often show symptoms similar to human obstructive sleep apnea due to blockage of the upper airway. The episodes occur due to the relaxation of upper airway muscles, which triggers irregular breathing patterns, disrupted sleep, daytime fatigue, and diminished well-being in both humans and dogs.

> *"Sleep apnea places people at considerable risk of conditions such as hypertension and cardiovascular disease. Sleep affects the body's immune system, hormone secretion, and metabolism. Sufficient, sound sleep is vital for quality of life. For these reasons and others, we are interested in canine sleep too," lead study author Iida Niinikoski, a doctoral researcher at the University of Helsinki's Faculty of Veterinary Medicine, told Earth.com.*[9]

Past research into sleep apnea in dogs has required that the animals either be connected to all sorts of equipment or placed into a certain type of box in a lab during sleep. Neither of these set-ups is ideal, and according to Niinikoski, made such research significantly challenging.

Fortunately, the university's Lung Insight research group was able to conduct the necessary studies using a neckband system that was initially developed for use with humans with sleep apnea. The dogs were able to remain in their own homes, where measurements were taken by the neckband.

The results showed that brachycephalic dogs displayed a considerably higher number of sleep-disordered breathing events compared to dogs with longer snouts. They also snored more often.

The neckband system is obviously a winner in terms of user-friendly tools to assess sleep disorders in dogs. Its use is currently limited to research environments, but one day it may be available for use in a wider range of settings.

Read **here** for information on a new noninvasive laser procedure to improve the breathing ability and quality of life of extreme brachycephalic dogs, and **here** for my interview with the veterinarian who is performing this life-saving procedure.

Sources and References

[1] Iotchev, I.B. et al. Brain Structure and Function, Volume 228, pages 2125–2136, September 24, 2023

[2,3,4,5,6] Phys.org, December 13, 2023

[7,9] Earth.com, June 13, 2023

[8] The Conversation, February 12, 2019