

# For Active Dogs!

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## The Eyes Have It



More specifically, dog eyes do and wolf eyes don't. Let me explain.

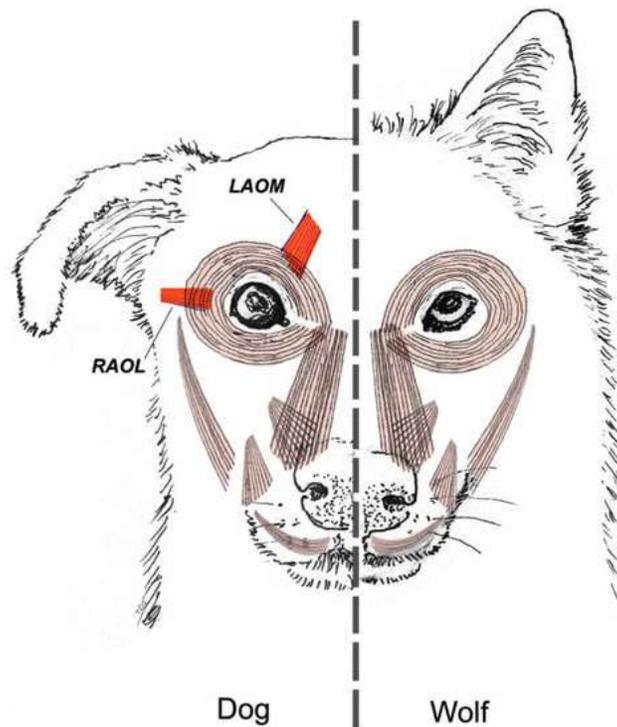
Collaborators in the UK and US examined in detail the facial muscles, especially the muscles around the eyes, of dogs and wolves (1).

It turns out that there are two prominent muscles that move the dog's eyelids that many wolves don't have, or if they do, they are vestigial – smaller and weaker. The first one, called the *levator anguli oculi medialis* or LAOM for short (why do we *still* use Latin names for muscles?) lifts the medial (the part of the eyebrows nearest the nose) part of the dog's eyebrow

up. Epic is using those muscles in the image above.

The second muscle, called the *retractor anguli oculi lateralis* or RAOL, pulls the outside corner of the dog's eyelid towards the ear, making the eye look larger and exposing some of the *sclera* – the white part of the eye.

Those two muscles are shown in red in the image below, with the dog's facial muscles illustrated on the left and the wolf's on the right. Notice how, when the LAOM contracts, it makes the inner part of the eyebrow lift and when the RAOL contracts, it makes the opening of the eyelid wider.



Facial muscles in the dog (left) and wolf (right) illustrating the two additional ocular muscles in the dog. (From Kaminski et al. PNAS 2019.)

Let's find out how those two tiny muscles might have played a critical role in the evolution of the wolf into human's best friend.

### **Your Dog Is Watching**

Dogs are remarkable in their ability to read our body language, including our facial features and expressions, to communicate with us. Dogs, but not wolves, establish eye contact with humans when they cannot solve a problem (2). And the gaze between humans and dogs results in mutual release of oxytocin, known as the "love hormone" [link to August FAD].

### **"Human-eyes-ing"**

Humans use eyebrow movements when they want to emphasize certain words or phrases (3). Remember how your friends' eyebrows moved closer together as they tried to solve a math problem in school? That's how we got the term "knitted eyebrows." And surely you recall your parents' eyebrows lifting when, as a teenager, you were caught coming home hours later than you had promised!

When people are looking for important points in others' speech, they tend to focus on the upper facial area, and particularly the eyes (4), and they pay attention to the same area when looking at pictures of dogs (5). One study showed that when humans lift their inner eyebrows, it makes them seem sad (6). Further studies have shown that humans are attracted to large eyes, like human babies have (2) and that we have a preference for interacting with animals that have visible sclera (7).

### **How It All "Knits" Together**

Here's how these canine anatomical features and our focus on the eyes for communication might have played a role in how a fearsome predator evolved into that warm, furry creature that sleeps on your bed at night.

Imagine you are a member of a hunter-gatherer tribe 33,000 years ago. A wolf walks by, and looks at you with curiosity. Because it is one of the wolves that has vestigial LAOM and RAOL muscles, it raises its eyebrows and widens its eyes just a bit. You (consciously or not) think that it looks just a tiny bit like a human baby (large-appearing eyes), or at least that it looks sad (elevated inner eyebrows). You have a caregiver response (your body releases oxytocin), and you leave some food out for the wolf. The wolf stays nearby, breeds with another wolf with similar facial features that is also getting handouts, and they have offspring that have larger and stronger LAOM and RAOL muscles. A few millennia later, you have the dog.

To strengthen the credibility of this scenario, a recent study showed that dogs that produce this sad-eyed appearance more often were more likely to be rehomed from shelters (8). Humans clearly are suckers for puppy-dog eyes!

One thing that the study didn't mention, but that must have come to your mind already is this: Could this be why so many breeds have cute little dots of a contrasting color on their medial eyebrows? Think about all the breeds of dogs with black and tan or tricolor markings like my canine pal, Epic, pictured above. Did we also select for this coloration to emphasize those eyebrow communications? I'm betting we did! Yes, the eyes definitely have it!

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