Snakes Vs. Legless Lizards! Are They One In The Same!?

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One commonly asked question is what makes a snake “a snake” when compared to what makes a legless lizard still a “lizard”? Are “legless” lizards really just “snakes”, or vice-versa? One would think that with both being relatively long, slender, elongated and cylindrical-bodied animals without limbs, or in some cases, nearly without limbs, that these animals would be one in the same. So how and why is it that some lizards which have gone “legless” are not actually snakes, and what are some physical and external, as well as some more internal and structural differences that set them apart? If one happens to live in an area of the world in which there are both snakes and legless lizards native to, how can one tell the difference? How might one otherwise be able to tell whether that animal at a pet store or a reptile expo is a snake or a legless lizard?

Adding to the confusion is oftentimes the fact that many species of “legless” lizards are often erroneously referred to as “glass” snakes in light of their unique defensive behavior of dropping their tails, which may comprise half or more of their bodies, which gives the illusion that they are “shattering” like glass.

In order to begin to answer this question, we must look into the ancestry of snakes and lizards, both of which fall into the large order "Squamata", collectively. As it turns out, "limblessness" is actually a functional trait that has evolved independently in squamate reptiles through at least one dozen or more lineages, which suggests that this evolutionary body plan had been an extremely successful one, with both snakes and lizards, as well as the amphisbaenians or "worm lizards" all branching off of a common ancestor. "Leglessness" is also certainly not unique to reptiles, and it has also evolved separately and independently in many other cases across the animal kingdom. Hence, why an "earthworm", caecilians (a lesser-known group of legless amphibians), and even some fish such as eels, for example, are also not snakes.

Most recently, this common ancestor is currently believed to be a 95-million year old fossil known as the species *Adriosaurus microbrachis,* leading to the conclusion that snakes and legless lizards lost their legs during about the same time. This specimen had tiny, almost non-functioning front legs, but still functional rear legs, and has been dated at approximately the same age as fossils of snakes from around the same time which had similar vestigial front legs.

Some discussion and debate as to this common ancestor still occurs to this day, with some scientists believing that a more aquatic, or marine ancestry in the form of the Mosasaurs. Regardless, this article is not intended to delve too deeply into the evolutionary origin and history of snakes and lizards. However, it is widely believed now that "legless-ness" was an adaptation for a fossorial, or burrowing lifestyle, which would certainly make sense, and we see many examples of both fossorial snakes and lizards even to this day.

With all of this said, here are the most commonly cited, and generalized differences between snakes and *most* species of legless lizards. While these may generally be the most widely accepted differences, a few species of legless lizards, and likewise a few species of snakes, may not always follow these rules of thumb, and, as with everything, there can be exceptions to every rule. The Burton's Legless Lizard (*Lialis burtonis*) of Australia, for example, is a species of legless lizard which lacks eyelids, and has more flexible jaws, enabling them to ingest relatively larger prey than most other legless lizards, which are two traits more commonly associated in differentiating snakes from legless lizards.

Differences in the Eye

-One such difference between snakes and most legless lizards are the presence (or absence) of eyelids. In ***snakes***, there is no outer eyelid, which, in other words, means that they are lacking. Instead, snakes possess a clear, transparent scale over each eye often known as the "spectacle", which are their evolutionary adaptation for helping to retain moisture in the eye while also protecting it from the outer elements of their environment without the use of eyelids.

-In most ***legless lizards***, on the other hand, there is an eyelid present and visible over each eye, which serves to protect their eyes in their environment without the aid of any clear or transparent spectacle. Some species of legless lizards, however, can also lack eyelids, having the same, or at least very similar clear scale or spectacle over each eye as snakes.

<u>Differences in the Ear</u>

-The presence (or absence) of external, or outer ear openings is another common defining characteristic separating snakes from most legless lizards. In ***snakes***, outer or external ear openings are lacking. While this still to this day lends to the mis-notion that snakes are “deaf” and cannot “hear”, this actually has been found to no longer be true. Snakes still do possess inner ear bones that allow them to “hear” or detect low frequency sounds that we might not be able to hear, or at

least not as well.

-In most ***legless lizards***, however, outer or external ear openings are present on each side of their head. Legless lizards don't have extra fleshy or cartilaginous components to their ears that we humans, and many other mammals do, instead usually being simply slits or openings on each side of their head, in addition to possessing the inner ear bones as well. As with before, however, some species of legless lizards can also lack external ear openings as well, making them similar to snakes.

<u>Differences in the Jaw and Head Musculature</u>

-When it comes to their jaws, *most* ***snakes*** have much more flexible and elastic skin in between their highly movable lower quadrate, or lower jaw bones. This gives most snakes the flexibility of swallowing or ingesting prey items much larger than their heads; despite the popular mis-notion, snakes do not actually "unhinge" or "dislocate" their jaws when swallowing a meal. Some more primitive snakes, however, lack this flexibility in jaw and jawbone musculature, a trait making them similar to most legless lizards.

-In most species of ***legless lizards***, by contrast, the jaws and jawbones are much more rigid and inflexible, lacking the quadrate bones and flexible skin that most snakes possess, and which typically enable

legless lizards to eat only relatively smaller prey or food items in proportion to their head. Some species of legless lizards, however, once again break this "rule" by having more flexible mouth and jaw musculature, allowing them to ingest some prey items which may be larger than their heads (see the Burton's Legless Lizard mentioned previously).

Differences in Their Skeletal and Musculature Structure and Movement and Locomotion*(these physical differences tend to be more minute and internal, and are most easily observed by examining how each tends to move when it comes to their locomotion).*

-When it comes to ***snakes***, most species also tend to have much more flexible skeletal and musculature structures than most legless lizards, enabling them a wider or greater degree of flexibility, movement, and locomotion. While each of the forms or methods of locomotion used by snakes will not necessarily be rehashed in this article, they nonetheless can include: lateral undulation (or the typical "serpentine" movement pattern), rectilinear locomotion, concertina, sidewinding, "slide-pushing", and a few other forms of locomotion. The belly, or ventral scales and surfaces of most snakes tend to be wider and flatter, enabling them to gain traction on a wider array of surfaces and situations than can most legless lizards.

-Most species of ***legless lizards***, by comparison, have comparatively more rigid and inflexible skeletal and bodily musculature, enabling them comparatively fewer forms of movement and locomotion than snakes. Their primary means of locomotion typically comprise of either the "lateral undulation" and/or rectilinear locomotion in collaboration with "slide pushing". Legless lizards can be fast moving and efficient

when they have objects or debris for them to do so (i.e. when in the grass, leaf litter, or other vegetation); however, they are not as efficient at movement when placed on an open surface such as open sand, or on pavement, for example. The belly, or ventral scales of most species of legless lizards are therefore less flat and wide than snakes, and resemble those of most other lizards which do have legs.

Other Differences

-Both snakes and lizards use their tongues as sensory adaptations, and have what is known as the Jacobson's Organ in the roofs of their mouths that serve as their primary olfactory organ, or sense of smell. However, most ***snakes*** possess relatively longer, more forked tongues, with their tongues being forked as a means of giving them a greater surface area for gathering scent particles upon from the air and environments around them. Most ***legless lizards***, on the other hand, tend to have shorter, fleshier, or thicker tongues characteristic of most other lizards with legs.

-One final difference between snakes and legless lizards are the lengths of their tails. While it might be easy to think that an animal without legs might just be all, or mostly tail, this actually is not the case. Both snakes and lizards have an opening located in the posterior halves of their bodies known as the "Vent" or "Ventral" opening, which is covered by

one or more larger scales for cover and protection known as the "ventral" or "anal" scale. This ventral opening acts as an all-purpose opening for the purposes of dispelling wastes, and for reproduction. The length of body following this opening are the tails of squamates, and may be where scent glands, or other additional reproductive organs may be located.

-Most ***snakes*** have comparatively short tails in relation to their overall bodies, usually comprising approximately 1/3 or less of their total overall body length. Most ***legless lizards***, on the other hand, have comparatively much longer tails, which may be ½ or more of their total overall body length. Caudal autotomy, which is a unique defensive behavior/strategy in which many species of lizards use specialized pressure points and musculature in their tails to voluntarily "shed" or "drop" all, or portions of their tails as a means of distracting or escaping from a predator, is exhibited in many species of legless lizards, which gives them the name "glass snake", even though they are not snakes. Snakes, on the other hand, are not known to exhibit this caudal autotomy, and although they can lose their tails in some cases due to injury, their tails do not regrow or regenerate as they would in many lizards.