

Tips to Prevent Aspiration in Juvenile Squirrels Shirley Casey and Allan Casey

Squirrel rehabilitators know that some young squirrels may develop respiratory conditions, often from aspiration during rehab care during rehab or if fed prior to admission. Here is a quick review of aspiration, causes and tips to prevent this from happening. As rehabbers well know, preventing a problem early on is much preferred to spending extra time and effort later trying to resolve it.

What is aspiration? Why does it matter?

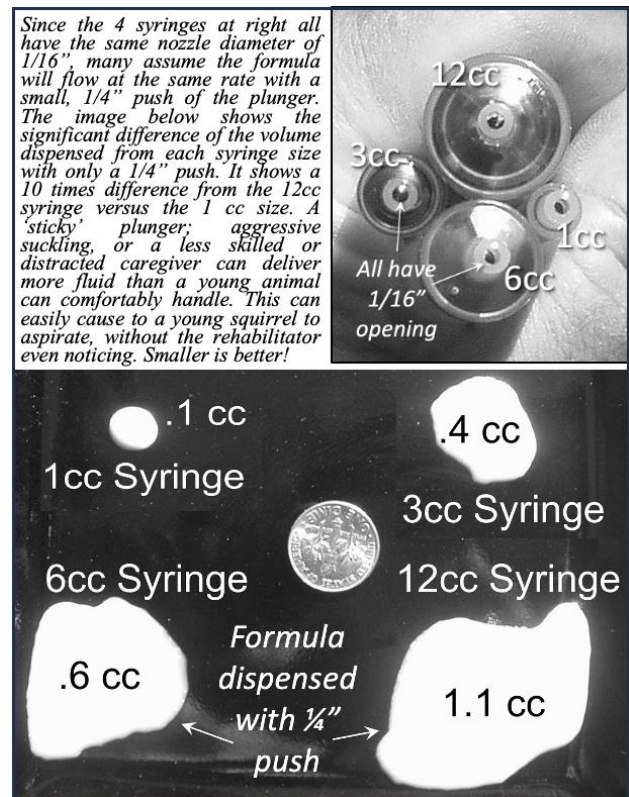
Aspiration is the *process* when foreign materials enter the respiratory system. This is more common with very young, small, or weak squirrels fed formula or hydration liquids that gets in their bronchial tubes or lungs. Such liquids can decrease lung area available for essential oxygen (breathing). Decreased oxygen capacity can have an immediate and serious impact.

Once introduced, foreign liquids in the lungs can cause inflammation and swelling, as well as provide a rich medium for bacteria to grow and infections to develop. Larger amounts of fluid aspirated at a single time or over multiple feedings certainly increase the impact on breathing – which may be noticed by audible or impaired breathing, and even by refusing food even though hungry (squirrels prefer to breathe than eat). The amount of liquid that enters the respiratory tract of a smaller squirrel may seem small or inconsequential to the human feeding it, but even .20 cc or a few drops is actually substantial for a tiny squirrel, under 40 grams, with small lungs. In many cases, squirrels can have aspirated formula when *no* formula bubbled from their nostrils – without problems noticed!

Formula in the lungs provides bacteria a rich medium to grow – particularly if the amount of formula in lungs accumulates over multiple feedings. Infections, however, may *not* occur if the squirrel aspirated a tiny amount (drop) of liquid a single time. The chances of infection may increase if the squirrel is compromised (cold, weak, dehydrated, injured, etc.); several health problems exist; a neonate with a less developed immune system; or the squirrel has aspirated formula multiple times.

Examples of common causes

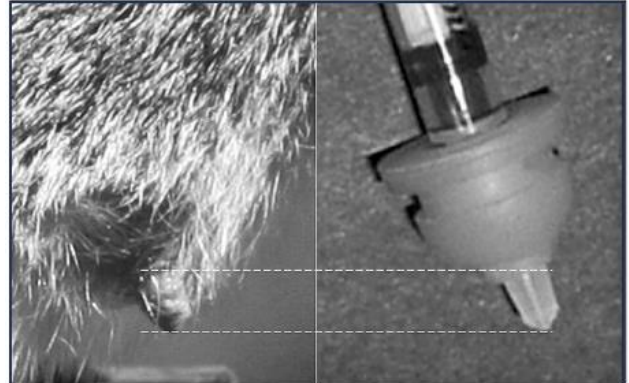
- Fed with a larger syringe, a pet feeding bottle, etc. or instrument larger than its' tiny esophagus. Or the nipple or nozzle opening is too large for the mouth or longer than the mother squirrel's nipple. This is particularly problematic with very small species, neonates and compromised animals.
- Fed too fast for the young squirrel to safely swallow each drop. Feeder pushes a plunger harder if it seems 'stuck', resulting in sudden gush of formula. Or the feeder uses a large syringe size (6 or 12cc) that provides excessive volume with just a tiny plunger movement (see right).
- Fed in inappropriate position. The squirrel or its head is moving around a lot during feeding. The squirrel moves or slips if it is on a surface where it can't get 'traction'/hold/grip. A terrycloth towel works well.
- Squirrel is stressed, distracted – chased / captured / handled, wrong feeding position; noise; visual distraction; unfamiliar or strong odors. As prey species, squirrels are especially sensitive to unfamiliar or strong sensory input that could be threats to their survival – even the very young (their olfactory senses are many times more sensitive than humans.)



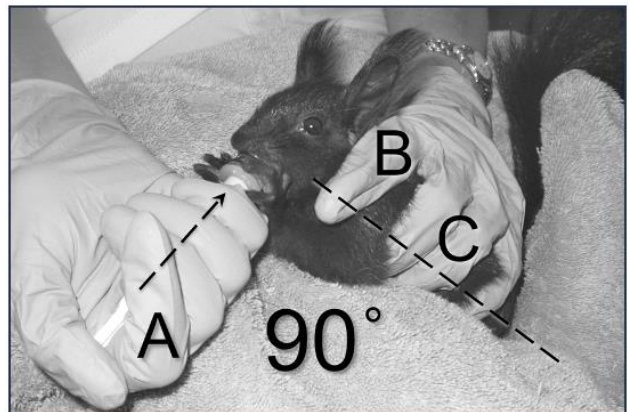
- Squirrel has a physical condition that causes discomfort, pain, difficulty swallowing (injury, fever, obstruction, etc.).
- ‘Lumps’ in the formula – so feeder pushes too hard, or too fast resulting in a gush of liquid or clumps that can go into lungs or obstruct throat.
- The feeder has limited skills or knowledge; is distracted and not paying close attention; or in a hurry.
- The squirrel resists being fed formula and still forced to eat. They may refuse to eat formula for many reasons (e.g., stress, fear, previous aspiration, feedings are too frequent or close together, inappropriate or inadequately prepared formula, spoiled formula, physical conditions).
- Person feeds too much at a time.
- Mistakenly assume it’s easy and fast to feed a squirrel, and anyone can do it!

Examples of ways to prevent aspiration

- Explain it takes knowledge and skill to feed a young squirrel – and serious problems can develop if not done carefully and well.
- Train *any* person feeding the young squirrels – explain, demo, practice, get coaching from rehabbers. Help new people learn to feed with squirrels that have their eyes open and are accustomed to being fed (avoid initial training with new admits or neonates).
- Monitor and coach new person feeding and coach on instruments, capturing, handling, feeding position and rate, etc.
- Prepare the formula to ensure it is smooth and well reconstituted (see Mixing Guide link below).
- Use a small syringe, not a bottle. Small syringe – 1cc if under 100 grams; 3cc if over 100 grams; NOT 5cc or larger sizes even if you think one can feed slowly!
- Consider length and diameter of syringe nozzle or nipple. A squirrel nipple/teat is small and has a smaller opening. (See top right image.)
- Consider a smaller nipple like a miracle nipple, a modified silicone nipple and a zoologic elongated nipple (see link in the resource list below).
- Hold syringe in a ‘Hitchhiker’ position (as shown as ‘A’ in the image at right), not held like giving an injection. It helps for new people to practice position for holding syringe *before* trying to feed a squirrel.
- Capture and handle carefully to minimize stress. Hold squirrel securely – but do not restrict eating or breathing. Consider using a ‘U-shaped’ finger collar on/around shoulders (as shown below right).
- Partially cover the body and body head with terrycloth, flannel or soft knit and *not* polished cotton (i.e., pillowcase). Hold the squirrel on a secure surface for secure traction (i.e., terry cloth, knit) – at a height to be able to see and monitor the squirrel swallowing (while not stressing the squirrel or unsafe).
- Feed in quiet calm secure room. Minimize distractions in room and from feeder (not on phone, watching tv, texting or talking with others).



Comparison of a modified feeding nipple with a lactating female squirrel teat shape and size.



A juvenile squirrel held in a sternally recumbent position on terrycloth towel and fed with syringe at 90° angle. Line (A) indicates rehabilitator's fingers curled over syringe plunger to control amount of flow. Left thumb and forefinger (B) form 'U-shaped collar' to maintain squirrel in position. Middle and ring fingers (C) curve under the body to stabilize position and reduce chance of escape.



Overhead view of rehabilitator's fingers in 'U-shaped collar position' to hold a young squirrel's head steady during feeding.

- Take the time to feed slowly, allowing ample time for squirrel to swallow at a comfortable pace. Consider a ‘push-pause’ pattern, balancing swallowing and breathing matched to squirrel’s ability to eat.
- If problems develop, pause, and adjust. Don’t hurry or keep doing the same thing! Recognize while there are many common ways to feed, some adjustments may be necessary for individuals with health conditions, stressors, etc.
- If possible, have the same caregiver feeding so he/she is familiar with each animal and the animal is familiar with the person feeding to reduce stress.
- *Consider more tips from rehab colleagues* (e.g., wiping off syringe nozzle or nipple before placing in squirrel’s mouth)!

Preventing aspiration is better than having it occur – and then needing to treat a problem

Successfully feeding formula obviously requires more than having a couple of instruments, prepared formula and getting food into the young squirrel. It takes knowledge, skill, appropriate feeding instruments, time, and focus. It is not easy or fast – especially with neonates, compromised, weak or squirrels newly admitted to rehab (and accustomed to getting their mom’s milk) – or when a new person is feeding them.

While it takes time to be fully prepared, successful outcomes for the squirrel and rehabber are better than having to deal with conditions arising from aspiration. More information is available in ‘Aspiration in Juvenile Squirrels: Etiologies, Treatment, Prevention’ published in the NWRRA Squirrel Rehab Resources compilation in 2012 and available online at the link below.

Authors

Shirley and Allan Casey have been licensed rehabbers and rehabilitating squirrels since 1986. They are founders of WildAgain Wildlife Rehab in Colorado. They have conducted research, training and published on many aspects of rehab since 1992, many of which are posted on www.Ewildagain.org. They are grateful for the input from fellow rehabbers and who contributed to these tips!

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Resources

Aspiration in Juvenile Squirrels: Etiologies, Treatment, Prevention

www.ewildagain.org/files/ugd/276f2e_f52232d55a44439fa140ed32a464104a.pdf?index=true

Modifying a Feeding Nipple for Squirrels in Rehab

www.ewildagain.org/feeding-nipple-for-rehab-squirrels

Formula Mixing Guide [includes videos]

www.ewildagain.org/formula-mixing-guide