

Everted Laryngeal Saccules in the Norwich Terrier

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Laryngeal saccules are soft, translucent to opaque, tissue masses that lie between the vocal folds and the lateral wall of the larynx. Their usefulness is little understood. All dogs have the tissue present but only some breeds seem to have difficulty with the saccules protruding past the vocal folds into the laryngeal opening. The most common breeds with saccule problems are brachycephalic breeds; short nosed, stenotic nares (pinched nose), enlarged tonsils, elongate soft palate and redundant throat tissue. Occasionally tracheal problems (microtrachea or tracheal collapse) may be associated with airway disease. The upper airway obstruction to breathing is thought to be the cause for enlargement and eversion of the laryngeal saccules. Negative air pressure caused by difficulty breathing creates a vacuum that affects the soft tissues of the saccules and makes them enlarge to become bulbous masses covering the vocal folds. Everted saccules were always thought to be a secondary problem of the brachycephalic breeds and were not suspect in the breeds with more normal face and sinus structure. Many of the affected brachycephalic dogs require surgery with stenotic nares opened, tonsils removed, soft palate resection and laryngeal sacculectomy to allow them to breathe better, if not normally.

Norwich Terriers have a very normal nose and head structure that should allow for very normal breathing. However, this breed seems to have a very high incidence of everted laryngeal saccules. The reason for the saccule problem is unclear causing breeders to attribute blame to multiple causes. Because Norwich Terriers are not a brachycephalic breed they do not have the upper airway disease changes that are the usual cause for the everted saccules. We have examined over 90 dogs and have been trying to evaluate symptoms with reference to any physical changes in the throats. Three of the dogs examined with enlarged saccules had been seen in other clinics and had previous tonsillectomy and/or soft palate resection. Four of the dogs examined with enlarged saccules had a birth defect of the soft palate in which a large part of the soft palate was not developed. Examinations revealed that over 95% of dogs presented had everted saccules; this included the dogs with previous airway surgery as well as the dogs with the congenital soft palate changes. The high incidence of everted saccules was not found to be related to elongate soft palate, and enlarged tonsils were only found in 3 of the dogs examined. Long term breathing difficulties may be the reason for the enlarged tonsils. Tracheal examination did not reveal collapsed trachea or microtrachea as a source for the everted saccules.

Clinical signs of everted saccules may include all or only some of the following: completely normal breathing with no respiratory symptoms, snoring, noisy breathing at rest, noisy breathing while exercising or walking on leash, coughing, nasal congestion, exercise intolerance, heat intolerance and/or heat stroke on less than a hot day, short breath and sensitivity in throat while on a choke collar. The most interesting finding was that we found everted saccules in dogs with complete absence of clinical signs. This underscores that all Norwich should be examined. Surgery is not imperative in a clinically normal throated dog. However, it cannot be assumed that a dog is normal because it has no symptoms.

Examination may be done with masked anesthesia or with I/V anesthesia. The use of Sevoflurane for mask anesthesia and ketamine/valium for the I/V anesthesia has proven very safe. The most important factor in examination is that the dog needs to be light enough to cough with laryngeal challenge. Several dogs that were examined appeared to have normal saccules until challenged. The laryngeal area is touched with a probe while under anesthesia causing the dog to cough with the result being eversion of the saccules. **When this examination technique is used in a normal dog, the saccules will not evert even with multiple induced coughing spasms.** The use of an anesthetic like Propophol makes this examination technique very difficult

because of the induced laryngeal paralysis. Some veterinarians give a second drug that will induce coughing during the Propofol anesthesia. It is imperative that examination be done properly to avoid an incorrect diagnosis. **The examination procedure will not cause future problems and is not harmful to the dog.** If the saccules are not everted at the initial exam and are found to evert with challenge we must consider that the saccules are a problem.

Examination is rapid and the dog is under anesthesia for a very short period. Laryngoscopy is not imperative at examination. Proper lighting and a tongue depressor may be used. Examination includes evaluation of the tonsils, soft palate, nasopharynx, saccules and trachea. The upper trachea is visible at a sedated oral exam, but to properly examine the trachea a laryngoscope will be necessary. Tonsils may be in the small crypts laterally, but will usually evert with any challenge. Large tonsils with obvious damage may need removal. The soft palate should be covering a fraction of the epiglottis and the caudal border may be just longer than the caudal aspect of the tonsils. Saccules should not be visible in the area lateral to the vocal folds, even with challenge. The trachea should be round and have a uniform diameter throughout its length.

If surgery is elected, the use of a laser is strongly recommended for the sacculotomy procedure. Our technique involves removing the visible saccules and then challenging the dog to cough. The cough will cause eversion of more saccule tissue allowing complete removal of the saccules. If a single pass of the laser is done, most dogs will have recurrence of saccule symptoms because the remaining tissue will evert within 2 to 3 months causing a return of symptoms.

We have had less than 10% of the sacculotomy surgical cases show continued symptoms after surgery. During examination we are trying to evaluate any abnormal airway changes. One of the areas that seemed significant during examination was the area of the nasopharynx. This is the tissue just dorsal to the larynx. In 12 dogs we found this tissue to be thickened and edematous with several of the dogs having moderate to severe clinical signs of upper airway disease. Only 2 of the dogs continued to have any airway signs postoperatively. We thought we had found the source for the everted saccules, but several of the dogs found with thickened nasopharynx tissue did not have any clinical signs before or after sacculotomy. This sounds confusing, but because of the lack of consistency in the dogs with thickened nasopharynx tissue we were not able to identify this as a primary cause for everted saccules.

Treatment of dogs with post op symptoms include the use of diphenhydramine (Benadryl) given at 1 mg/# body weight 3 times daily. Yellow or orange Triaminic given at 2 to 3 ml 3 times daily has been used if the Benadryl does not work. Human cortisone nasal spray used with a dropper giving one drop in each nares 2 to 3 times daily. These medications have been quite safe for long-term usage.

We are recording video examinations of dogs and include tonsil, soft palate, saccule exam and tracheal exam while the dog is sedated. We have found that it is **imperative** to challenge the dog to cough to have a proper evaluation of the saccules. It is important to realize that the challenge of the larynx will not harm the dog and that the saccules will only evert if they are affected. The anesthetic may cause relaxation of the throat allowing everted saccules to appear normal without challenge. It is also important to know that, in a normal throat, the challenge will not cause eversion of saccules. Airway surgery without a complete examination should not be allowed in any Norwich Terrier. Continued monitoring of affected and nonaffected dogs will be needed to hopefully determine the cause and give hope to clear this problem from the Norwich Terrier.