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## HOW CAN WE DIFFERENTIATE INNOCENT MURMURS FROM PATHOLOGIC ONES IN ASYMPTOMATIC PUPPIES?

*What should we advise to owners of clinically healthy pets, when we detect a cardiac murmur at the first veterinary health check? Important differences between young and adult animals will be emphasized.*

Cardiac auscultation is one of the cheapest and least invasive screening test that practicing veterinarians use on a daily basis to look for congenital or acquired structural cardiac diseases. Detecting a cardiac murmur may have a major impact, but it can also be a clinically not relevant coincidental finding. The etiology of murmurs is very much different in young animals (puppies and kittens), compared to adult and geriatric cats, adult small breed dogs and adult large breed dogs.

### Murmurs in puppies and kittens

Cardiac auscultation is part of a routine health check at the time of the first veterinary visit at the age of 6 weeks to look for congenital cardiac anomalies. The reason why we want to diagnose congenital cardiac anomalies is to protect the interest of the breeders, the new owners, the breed and the affected individual animal. Veterinarians should help breeders so that no pets with a clinically silent congenital cardiac anomaly would be sold to a new owner. Congenital cardiac anomaly is rare, but most of them cause a murmur. On the other hand, up to 20% of clinically healthy puppies at the age of 7 weeks have an innocent cardiac murmur. Auscultation characteristics are relatively specific and experienced veterinarians can differentiate innocent from pathologic murmurs with quite a high degree of certainty. Innocent murmurs are always soft (1-2/6), systolic and often have a musical character (ie resembling the noise of a flying mosquito). When a louder systolic murmur is heard (especially with a palpable thrill) or the murmur has a diastolic component, the murmur is pathologic. Puppies with such pathologic murmurs should ideally be referred to a veterinary cardiologist without any delay. Most puppies and kittens with congenital cardiac anomalies grow well and show no clinical signs of a cardiac disease at all. This does not mean that the cardiac

condition is innocent. Exceptions are young animals with right-to-left shunting complex cardiac anomalies (such as tetralogy of Fallot) or the presence of congestive heart failure: these animals do not grow well and typically show at least exercise intolerance. Several congenital cardiac anomalies can be treated well (such as patent ductus arteriosus, dynamic aortic stenosis and pulmonic stenosis) if diagnosed early enough. Some congenital anomalies cause no or only a very soft murmur, such as atrial septal defect or mitral stenosis. Therefore, the absence of an audible murmur does not rule the presence of a congenital cardiac anomaly. In predisposed breeds cardiologic screening is recommended to find affected individuals.

### Recommended reading

- Szatmári V, van Leeuwen MW, Teske E. Innocent cardiac murmur in puppies: prevalence, correlation with hematocrit, and auscultation characteristics. J Vet Intern Med. 2015;29:1524-1528.
- <http://ejcap.fecava.org/en/ejcap-online-262-summer-2016-english/s03---heart-murmurs-in-pups-when-should-i-be-worried.html>