

# Guidelines for combating hereditary cardiac diseases



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These guidelines complement the Rules for Combating Hereditary Defects and Diseases (Council 30 November 2008) and the Directives for the Programme for Combating Hereditary Defects and Diseases (PEVISA Guidelines, Board 28 August 2008).

*This document is a translation. In cases of doubt, the Finnish version will prevail.*

## 1 Introduction

The purpose of cardiac examination is to monitor the occurrence of cardiac diseases in dogs and to support the prevention of these. These guidelines will determine how the prevention is implemented in practice. The Finnish Kennel Club accepts certificates issued in accordance with these guidelines.

An official cardiac examination sanctioned by the Finnish Kennel Club (hereinafter cardiac examination) may be performed on any breed, but for certain breeds the examination or some component of it can be a requirement for breeding use (PEVISA programme).

The cardiac examination includes

- auscultation, i.e. listening to heart sounds
- echocardiographic examination, which includes an auscultation and an electrocardiogram in addition to an echocardiography

It is standard practice that only a cardiac auscultation or an extensive, breed specific cardiac examination, including a more precise examination of cardiac conditions typically occurring in the breed, is performed on the dog. The latter examination may for instance include an echocardiographic examination and a five-minute ECG, or an echocardiographic examination and a 24-hour ECG, i.e. Holter.

For breeds in which cardiomyopathies typically occur (a list kept by the cardiac working group), results that only include auscultation are not published.

If a cardiac examination is adopted as part of a breed's PEVISA programme or breed specific breeding strategy (JTO), it will become necessary to determine, in cooperation with the Finnish Kennel Club's cardiac working group, which cardiac disease or diseases the prevention measures of that breed shall target. The cardiac disease working group will define the breed's heart disease diagnosis criteria and reference values based on published scientific studies. The diagnosis criteria and reference values will be incorporated into the breed's PEVISA programme or JTO.

Only a certificate issued as stipulated under these guidelines will be accepted in the Finnish Kennel Club for dogs, whose owner/holder resides in Finland.

The Finnish Kennel Club does not consider cardiac examinations performed abroad as official. For foreign stud dogs and imported dogs used for breeding, a cardiac examination certificate issued by a foreign veterinarian is approved for litter registration. The certificate must indicate the dog's ID number (chip/tattoo). At the time of mating, the certificate may not be older than acceptable under the breed specific PEVISA programme. The certificate must unambiguously indicate that the dog does not suffer from cardiac diseases that the breed's PEVISA programme mentions as excluding it from breeding use.

### **1.1 Finnish Kennel Club authorization to perform cardiac examinations**

The Board of the Finnish Kennel Club will, based on proposals made by the cardiac working group, name the veterinarians who are authorized to issue cardiac examination certificates. Veterinarians must meet the requirements presented in these guidelines to qualify for Finnish Kennel Club authorization. The cardiac disease working group will process applications at least two times each year.

#### Auscultation authorization

A Finnish Kennel Club-sanctioned heart auscultation may be performed by a veterinarian with a Finnish veterinary specialist degree in small animal diseases or the corresponding international graduate degree in the small animal field (Diplomate certification). No separate application for authorization is necessary.

The eligibility of a holder of some other foreign graduate qualification to perform authorized auscultation exams will be assessed by the cardiac working group on application.

Other veterinarians licensed to practice in Finland are required to perform an auscultation examination on 20 dogs under the supervision of a veterinarian with Finnish Kennel Club authorization to perform auscultations. At least ten of these dogs must have a heart murmur. A certificate signed by the veterinarian who supervised these auscultations is then submitted to the Finnish Kennel Club's cardiac working group.

#### Authorization to perform echocardiographic examinations

A Finnish Kennel Club-sanctioned echocardiography may be performed by a veterinarian licensed to practice in Finland who has passed a skills demonstration test organized by the Finnish Kennel Club's cardiac working group. An exception to this applies to veterinarians with European or American Diplomate certification in small animal cardiology who are not required to participate in the test. The eligibility of holders of some other foreign graduate qualification to perform authorized echocardiographic examinations will be assessed by the cardiac working group on application.

In order to be granted authorization to perform echocardiographic examinations, a veterinarian must submit an application to the Finnish Kennel Club's cardiac working group. The application must be accompanied by a resume that shows the veterinarian has adequate work experience in small animal cardiology, has completed relevant post-graduate courses, and details what cardiac exam equipment the applicant has access to (echocardiography machine and electrocardiogram system). A full cardiac examination of two patients (one patient must have a valve disease) performed by the veterinarian with the echocardiography machine he or she uses at work must be attached to the application. Instructions for an echocardiographic examination are available from the cardiac working group. The application determines the veterinarian's eligibility to take part in the skills demonstration test organized by the cardiac working group.

### **1.2 Minimum age for cardiac examination**

The minimum age for an official cardiac examination is 12 months unless other age limits are set in the breed specific PEVISA programme.

The minimum age required for an extensive cardiac examination for acquired cardiac diseases (degenerative mitral valve disease MVD and dilated cardiomyopathy DCM) is 12 months unless other age limits are set in the breed specific PEVISA programme.

For congenital cardiac conditions, such as pulmonary (PS) and aortic stenosis (SAS), an official certificate can be issued for a dog that has not yet turned one year.

## **2 Performing the examination and certificate issuing procedure**

Separate instructions on how to perform a cardiac examination in practice will be issued to veterinarians. Results of the cardiac examination are recorded on a digital cardiac examination referral.

### **2.1 Clinical examination**

A clinical examination shall be performed without exception on all dogs undergoing a cardiac examination. This will focus special attention on identifying possible changes caused by heart failure.

### **2.2 Heart auscultation**

Heart auscultations are performed to identify murmurs. Murmurs are associated with several cardiac conditions, such as degenerative valve disease and congenital heart disease. It is not, however, possible to determine which cardiac condition the case involves based on a murmur. Instead, a cardiac ultrasound is usually recommended as a follow-up test. Murmurs cannot always be detected in association with dilated cardiomyopathy (DCM). Therefore, an auscultation is not a sufficient examination when determining the occurrence of DCM.

A murmur can also be the result of some other illness or be benign (a so-called physiological murmur, which is not associated with a cardiac condition).

Murmur findings are assessed as follows:

The timing of the murmur: systolic, diastolic, or continuous.

Location of maximal intensity murmur: mitral valve region, pulmonary artery region, aortic region, tricuspid valve region, or non-localised.

The intensity of a heart murmur is classified according to the following scale:

- Grade 1 – Very faint murmur with low intensity that can only be heard in a peaceful setting
- Grade 2 – Localised faint murmur, which can nevertheless be heard immediately
- Grade 3 – Medium-level murmur, can also be heard from a broader area, own heart sounds audible
- Grade 4 – Strong murmur, which can be heard from a broad area, own heart sounds become inaudible, no palpable thrill
- Grade 5 – Strong murmur with a palpable thrill. Readily audible when the stethoscope comes close to the dog's chest
- Grade 6 – Strong murmur with a palpable thrill. Audible even when the stethoscope is lifted off the dog's chest

### **2.3 Heart rhythm examination (resting ECG and/or long-term ECG monitoring)**

Electrocardiogram (ECG) tests are performed to analyse the electrical activity of the heart and identify any arrhythmia possibly caused by irregularities in this activity. Resting ECG (for 5 minutes) must always be performed when a clinical examination or auscultation identifies irregularities in the rhythm of the heart. In certain breeds, arrhythmia is associated with cardiac diseases like dilated cardiomyopathy (e.g. Dobermann and Boxer). Long-term ECG monitoring, i.e. Holter monitoring, is used to identify more transient types of arrhythmia that might not be revealed by a regular, short recording. This involves the recording of the heart's electrical activity for at least 24 hours using a portable ECG monitor.

### **2.4 Echocardiographic examination**

Echocardiography can be used to create images of the heart's structure, enabling analysis of its functioning. Echocardiography is used to diagnose congenital heart defects and so-called acquired heart conditions such as dilated cardiomyopathy and degenerative valve disease. An echocardiographic examination can identify which specific heart disease the patient is suffering from and the seriousness of the condition underlying the detected murmur.

An echocardiographic examination defines many measurements related to the size and functioning of the heart that can be compared to published normal values relative to the dog's breed and weight. The examination is always done to test for all identifiable heart conditions using two-dimensional, M-mode and Doppler ultrasound. All findings are recorded on the cardiac examination referral.

### **2.5 Conclusions of the cardiac examination**

The veterinarian issuing the certificate shall provide an assessment of the existence and severity of possible cardiac conditions based on the examination findings.

If only an auscultation is performed on the dog, the result of the examination (murmur) is recorded in the relevant field on the referral.

If a cardiac ultrasound is performed on the dog, the veterinarian issuing the certificate will also fill in the summary on the referral. This summary evaluates, based on the examination findings, whether the dog is showing signs of cardiac disease on the day of the examination.

Examination findings regarding each cardiac condition (MMVD = myxomatous mitral valve disease; DCM = dilated cardiomyopathy; SAS = subaortic stenosis; PS = pulmonary stenosis, Other heart disease = some other identified cardiac condition) will be noted in the conclusion section using the following abbreviations:

- A – no findings point towards a cardiac disease on the day of the examination.
- B – the result is inconclusive with regard to this cardiac disease: the findings on the day of the examination do not make it possible to assess without follow-up monitoring whether the dog is, with respect to the cardiac condition in question, healthy or ill.
- C – findings point towards the cardiac disease in question on the day of the examination.

More detailed instructions for the diagnostic tests of various cardiac conditions can be obtained from the Finnish Kennel Club's cardiac working group.

## **3 Valid examination result of a dog and contradictory examination finding**

Breed specific PEVISA programmes will abide by a valid examination result. Breed clubs will issue additional guidelines on how the results should be approached in breeding.

Certificates that state that the dog is free of any signs of cardiac disease are valid for 12 months, unless other restrictions are set in the breed specific PEVISA programme or the dog acquires another result that replaces the previous one (Table 1). Such results include 'No murmur' for auscultation examination, and 'No signs' for echocardiography and arrhythmic examinations.

An exception to the above are results from examinations performed for congenital cardiac conditions on a dog that is at least 12 months old: if the dog is at least 12 months old by the time of the examination, the examination for congenital cardiac conditions does not have to be renewed.

If a murmur is discovered in auscultation or the result from some other cardiac examination is 'Inconclusive' or 'Signs', the result in question is valid indefinitely or until a new result replaces the previous one in accordance with Table 1. The main principle for replacement of results is that the result acquired with a more precise examination method replaces the previous result. Order of precision: auscultation > echocardiography + 5-minute ECG > echocardiography + 24-hour ECG (Holter). In addition, a dog that has previously showed no signs of cardiac disease may develop a cardiac condition with age. Therefore, the result 'Signs' often replaces a result stating that no signs are found.

Table 1. Replacing cardiac examination results with a new result (AUS: auscultation, UÄ: echocardiography)

Examination method (condition investigated) and 'result'	Age of dog by the time of the examination	Replaced by the following re-examination
AUS 'Murmur, no'		AUS or UÄ
AUS 'Murmur, yes'		UÄ
UÄ (MMVD) 'No signs'		UÄ (MMVD)
UÄ (DCM) 'No signs'		UÄ (DCM)
UÄ (congenital heart disease) 'No signs'	12 months	Panel examination
UÄ (congenital heart disease) 'No signs'	under 12 months	UÄ (congenital heart disease), dog at least 12 months old
5 min. ECG and Holter 'No signs'		Holter
UÄ (MMVD) 'Inconclusive'		UÄ (MMVD)
UÄ (DCM) 'inconclusive'		UÄ (DCM)
UÄ (congenital heart disease) 'inconclusive'		UÄ (congenital heart disease)
5 min. ECG and Holter 'inconclusive'		Holter
UÄ (MMVD) 'Signs'		Panel examination
UÄ (DCM) 'Signs'		Panel examination
UÄ (congenital heart disease) 'Signs'		Panel examination
5 min. ECG and Holter 'Signs'		Holter

#### 4 Appeals procedure

The findings of an auscultation examination cannot be appealed. An ultrasound examination can be performed on the dog to confirm the findings.

A dog owner may appeal against the findings of ultrasound and electrocardiogram examinations. A written appeal must be submitted, with appended copies of all previous examination certificates issued to the dog.

Appeals are handled by the Finnish Kennel Club's cardiac working group. The dog is examined in the cardiac panel, simultaneously by two animal cardiologist or echocardiography veterinarians. A veterinarian, who has issued a certificate subject to an appeal, does not take part in the processing of the appeal/request. Chance to attend a cardiac panel is provided within six months from submitting the appeal. Cardiac panels are held twice a year at the most.

The dog owner must pay a processing fee set by the Finnish Kennel Club before the appeal is taken into deliberation. The fee is non-refundable.

A decision made by the Finnish Kennel Club's cardiac working group will be considered a valid examination result for the dog.

## **5 Exceptional cases**

The Scientific Commission of the Finnish Kennel Club is entitled to grant an exemption from the regulations presented in these guidelines if there is very compelling reason to do so in a one-off exceptional case.