

# Ultrasound-compatible 3D model of the equine heart

Created on: 02-02-2023 - Last modified on: 20-09-2023

## SCOPE OF THE METHOD

<b>The Method relates to</b>	Animal health
<b>The Method is situated in</b>	Education and training, Translational - Applied Research
<b>Type of method</b>	In chemico
<b>This method makes use of</b>	Animal derived cells / tissues / organs

## DESCRIPTION

### Method keywords

Phantom

Echocardiography

3D model

3D printing

## **Scientific area keywords**

Equine Cardiology

interventional cardiology

Cardiac electrophysiology

veterinary medicine

Veterinary education

## **Method description**

In contrast to human medicine, standard imaging techniques for cardiac interventions, namely fluoroscopy, CT and MRI, cannot be used in horses because the size of their thorax is too large for the gantry (CT and MRI) or results in insufficient detail (fluoroscopy). Therefore, echocardiography is essential as an imaging technique for diagnosis of cardiac disease and guidance of intracardiac catheterisations in equine cardiology. A 3D model of the equine heart compatible with ultrasound imaging has been developed based on a 3D computer model acquired from CT imaging of the heart of a pony. Placed in a watertank with silicone windows, equine echocardiography can be simulated and catheters can be introduced and manipulated to simulate intracardiac interventions. The model is therefore useful in the professional education of echocardiography (in the context of specialist training) and development of intracardiac interventions guided by echocardiography. This way, the number of horses used in education can be reduced, catheter manipulations can be trained in the context of specialist training and novel intracardiac therapies with appropriate devices and imaging guidance can be developed *in vitro* before applying them in live horses.

## **Lab equipment**

- Water tank with silicone windows
- Ultrasound unit

- Optional: Catheters for intracardiac interventions

### **Method status**

Still in development

### **PROS, CONS & FUTURE POTENTIAL**

#### **Advantages**

- Anatomically correct representation of a healthy equine heart
- Development and training of cardiac interventions before application in live horses
- Education of echocardiography in safe environment

#### **Challenges**

- No flow, which can influence catheter manipulations
- No heart contractions, which can influence catheter manipulations and limits education of functional echocardiography
- No valves, which can influence catheter manipulations and are important landmarks in echocardiography

#### **Modifications**

A pumping system could be connected to simulate flow.

#### **Future & Other applications**

Similar models could be created including pathological conditions, and could be used in veterinary education and simulation of repair interventions.

## REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

### Associated documents

### Links

[Equine Cardioteam](#)

## PARTNERS AND COLLABORATIONS

### Organisation

**Name of the organisation** Ghent University (UGent)

**Department** Department of Internal Medicine, Reproduction and Population Medicine

**Country** Belgium

*Coordinated by*



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