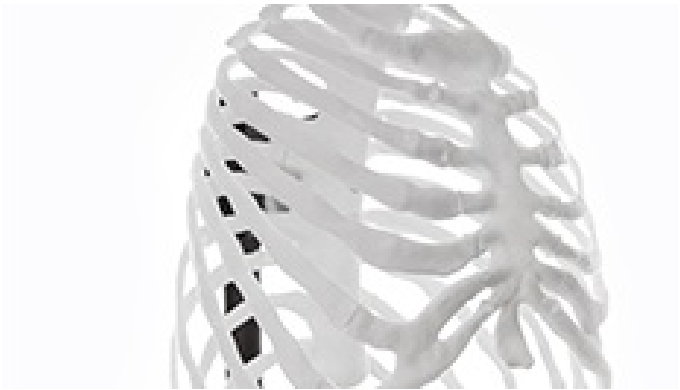# Thorax simulators – Anatomically correct training models of the chest cavity

This simulator aims for a realistic training system for thoracic surgery, applicable for both open and minimally invasive procedure

Central components are (I) a modular thorax model based on real CT data, whose ribs are connected by a plug-in system, and a (II) simulation trainer for abdominal interventions. The design process was based on the guidelines of the VDI and the usability requirements of the MDR. Various concepts were designed and manufactured. The selection of a preferred variant was made by the head of the thoracic surgery department at Magdeburg University Hospital. The components are manufactured additively, to provide a flexible organ tray.

The training system consists of a holder on which a right hemi-thorax and a synthetic skin can be attached. It can be combined with a P.O.P Trainer (Optimist GmbH), which allows the use of animal organs including their perfusion as a Wet Lab application. flexible grid is connected to the bottom to keep animal organs in an anatomically correct position. The evaluation employed crite that were derived from general requirements for medical training systems. The model meets the criteria and convincingly represented clinical conditions compared to other thoracic simulators. The geometry and modular system of the thoracic model provides advantages over other systems. Furthermore, it mimics the arrangement and functioning of organs more realistically, especially by imitating the vertical movement of the heart through pulmonary ventilation.

The design should be improved in order to simplify handling and the soft tissue shell should become more realistic. Aligning with high standards set by VDI and MDR creates the prerequisites for future approval as a valid training option.

By-products of the developed hemi-thorax are complete thoracic models (male and female) as well as 3-rip models. These mode are already in use by medical device companies in their R&D workflow as well as user training.

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Vorteile / Advantages

- ▶ realistic
- ▶ multi-use
- ▶ functional properties
- ▶ modular

Anwendungsbereiche / range of application

- ▶ surgery training
- ▶ R&D medical devices