



Technology Opportunity, Ref. No. UZ-19/627

## Patient-specific synthetic vertebrae with realistic anatomic and biomechanical properties for training and preoperative simulation

3D-printed patient-specific synthetic vertebrae have been developed that allow realistic visual and haptic simulation of spinal surgical procedures

**Keywords** synthetic vertebrae, patient-specific, 3D printing, realistic anatomic and biomechanical properties

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**Reference** in preparation

**Background** High levels of surgical expertise are required in spondylodesis surgery as surgical mistakes may create severe complications. Therefore, there is a need for synthetic vertebrae with realistic haptic and biomechanical properties for training and preoperative simulation.

**Invention** A parametrizable model and a 3D-printing method has been developed which is adaptable to subject- and pathology-specific characteristics of vertebra. This offers the possibility to generate bone-density specific models, which will improve training of spinal surgical procedures. Furthermore, haptically realistic patient-specific spine models can be 3D-printed for preoperative haptic simulation. Haptics and biomechanical properties of the new spine model during pedicle screw insertion were analysed in a clinical trial and were favoured by the spine surgeons over commercially available models.



**Fields of Use** Education, training and simulation of spinal surgical procedures

**Patent Status** Patent pending

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