# Towards realistic patient-specific human models for virtual reality regional anaesthesia simulation

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ESRA Topic: Peripheral Nerve Blocks

**Background and aims**: Performing regional anaesthesia (RA) requires advanced practical skills difficult to acquire in current training practise. Virtual-reality environments provide realistic training platforms, as aimed by the European project 'Regional Anaesthesia Simulator and Assistant' (RASimAs, www.rasimas.eu). This calls for accurate virtual models of human. Within the framework of patient-specific modelling, we aim at providing a realistic generic model for the femoral region.

**Methods**: The model used for the project contains skin, fat, muscles, nerves and blood systems, all of interest for RA. Three-dimensional (3D) observations and millimetre axial slices showed however wrong positioning of the nerve. Its position in relation to the *iliopsoas* muscle has been manually corrected slice by slice and the 3D resultant calculated. Missing structures, but ensuring an important haptic feedback in RA simulations, the *fascia iliacus* has been generated by expanding the femoral nerve structure in 3D, and the *fascia iliacus* by applying morphological dilatation and closing filters on the anatomical structures located inside subcutaneous fat.

**Results**: Using image processing and computer graphics techniques, the *fascia iliacus* and *lata* have been added to the model as additional surface layers and the 3D femoral nerve corrected. An expert qualitative evaluation has been performed, considering the new model as realistic for RA simulation.

**Conclusions**: Despite high needs in virtual-reality medicine, existing commercial human models lack of accuracy for realistic simulations. This study proves the need for expert evaluation and enhancement before use in medical environment. The next steps include registration of this realistic model on patient-specific data.

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