Lumbar discectomy haptic simulator

A cognitive task analysis (CTA) was performed to define a realistic and helpful scenario-based simulation. Based on the results a simulator for lumbar discectomy was developed. Additionally, a realistic training operating room was built by Adermann et al.,.

The CTA showed a need for realistic scenario-based training in spine surgery. The developed simulator consists of synthetic bone structures, synthetic soft tissue and an advanced bleeding system. Due to the close interdisciplinary cooperation of surgeons between engineers and psychologists, the iterative multicentre validation showed that the simulator is visually and haptically realistic. The simulator offers integrated sensors for the evaluation of the traction being used and the compression during surgery. The participating surgeons in the pilot workshop rated the simulator and the training concept as very useful for the improvement of their surgical skills.

In the context of the present work a precise definition for the simulator and training concept was developed. The additional implementation of sensors allows the objective evaluation of the surgical training by the trainer. Compared to other training simulators and concepts, the high degree of objectivity strengthens the acceptance of the feedback. The measured data of the nerve root tension and the compression of the dura can be used for intraoperative control and a detailed postoperative evaluation [1)].

1)
Adermann J, Geißler N, Bernal LE, Kotzsch S, Korb W. Development and validation of an artificial wetlab training system for the lumbar discectomy. Eur Spine J. 2014 Sep;23(9):1978-83. doi: 10.1007/s00586-014-3257-3. Epub 2014 Mar 5. PubMed PMID: 24595488.