

## Transfer of surgical skills: the importance of arthrosimulation training for orthopaedic surgery residents

**Introduction:** Arthroscopic surgery is a fundamental yet complex task in orthopaedic surgery. It calls for a steep and long learning curve. The higher number of residents per program, the restriction on work hours and the exponential increase in information are acknowledged current issues in residency training, and directly affect residents learning and patient safety. Simulation training has been introduced and validated in other surgical disciplines but is still under-utilized in orthopaedic surgery. It has been linked to decreased operating room time and increased patient safety.

We evaluated the effectiveness of an accessible, short and efficient arthrosimulation training program on skills transfer in the operating room for residents.

**Method:** We conducted a large prospective cohort study throughout Orthopaedic Residency Programs, comparing residents' knee arthroscopic technical skills *in vivo* depending on their level of orthopaedic training and their randomization to a 10-hour arthroscopic simulation training. Each resident *in vivo* video session were assessed by two blinded evaluators using validated assessment scoring systems such as the BAKSSS (Basic Arthroscopy Knee Skill Scoring System).

**Result:** Residents performances from four orthopaedic surgery programs were assessed and evaluated by two examiners. Residents who participated in a 10-hour simulation curriculum performed better in most aspects of the assessment tool. Some junior residents even surpassed the senior residents group who was not randomized to simulation training.

**Discussion:** Current issues in residency training include decreased work hours, increased number of residents and exponential increase in the complexity of tasks and amount of knowledge required. These factors combined with recent developments in simulation technology prompted us to ask whether arthroscopic skills learned through simulation could be transferred in the operating theatre. In skills transfer concept, the principles of specificity of the task and environment are important issues. Although arthrosimulators do not yet offer a completely realistic replicate of surgery, simulation training was thought to be sufficient to induce a change in skills and competence in the operating room. Residents who participated in the simulation curriculum performed better in most aspects of the assessment tool. Interestingly some junior residents even surpassed senior residents who were not randomized to simulation training. A follow-up of these cohorts will enable us to show the durability of skills transfer we were able to demonstrate.

**Conclusion:** Arthrosimulation in orthopaedic residency training improves residents' skills in the operating room at any level of training and directly affects patient safety. Skills transfer, from simulation to the operating theatre, is possible in arthroscopy and justifies dedicated simulation training time in residency programs.