The advanced multidisciplinary laparoscopic trainer

“At our department we make extensive use of the LAP-X to complement our residents in their laparoscopic training

- Dr. med. Jan Klein,
SLK-Kliniken Heilbronn, Germany
Faster recovery, reduced patient discomfort, smaller incisions and smaller scars are, among other benefits, important elements that have made minimally invasive surgery (MIS) more common. Though MIS has obvious advantages, there are many factors that make these procedures difficult to perform: motion inversion, reduced haptic perception, limited visibility, reduced access, etc.

This is why simulation based training is of high importance when it comes to an effective and safe way of training for these difficult surgical interventions. Medical training with simulation based courses results in a shorter learning curve due to training in a realistic environment, which leads to potential decreases in medical errors. LAP-X II aids to standardize, structure and complement hands-on skills training.

LAP-X II is suitable for anyone who is involved with MIS: surgeons, residents, students, operating room assistants and other healthcare professionals with specialties in general-, gastrointestinal- and pediatric surgery, gynecology, urology and more. Users will have the opportunity to train in a controlled environment where mistakes can be made without harming actual patients.

LAP-X II can be used to acquire as well as maintain laparoscopic skills, making it a system suitable for trainees and students, as well as for doctors in residency training and a wide range of medical specialists. The LAP-X II can also be used as a warming up exercise before a real laparoscopic intervention.

The educational platform and customizable training courses of the LAP-X II allow for the system to be integrated in any curriculum or training program. Suitable for individual- as well as team training, the LAP-X II enhances knowledge and technical skills, and improves communicational skills and team work.

LAP-X II is available in different models, which can be used in training rooms, skills centers, workshops, seminars, (teaching) hospitals and universities. It is a flexible system, ready to be integrated with existing training programs, curricula and courses. Assistance is available for seamless integration or personalized solutions.

For efficient medical training it is imperative that the training environment replicates realistic haptic perceptions of the procedure that is being executed. LAP-X II uses unique patented haptic feedback technology which delivers great precision and provides an important realistic sense of touch to the training exercises. The haptics are smooth, and gradually increase and decrease in strength and resistance, creating a life-like interaction. The sense of touch when interacting with the simulated anatomies adds an important element to MIS training. The ability to differentiate between different types of tissue, organs, cavities and anatomical substructures, which consist of extensive exercises, different anatomies and increasing levels of difficulty, Exercises can be incorporated in customizable training courses, with each exercise featuring a description and instructions, a video course, a 3D anatomical atlas and step-by-step virtual tips. Students have their own accounts, in which comprehensive scores, statistics and recorded videos of their performances can be reviewed and assessed by the user and by the instructor. The extensive statistical reports and recorded performance videos provide an effective way of tracking learning curves and training progress.

LAP-X II is built not only to be a skills trainer, but also to serve as an effective educational platform for rule- and knowledge based behavioral training, which is essential for performing safe laparoscopic procedures. The LAP-X II software contains various modules, comprehending score boards, statistics and recorded videos of their performances can be reviewed and assessed by the user and by the instructor.

The extensive statistical reports and recorded performance videos provide an effective way of tracking learning curves and training progress.
LAP-X II Smart*
LAP-X II Smart has a compact portable design which can easily and conveniently be placed on any table for training; the perfect solution e.g. in skills centers, workshops and seminars.

Complete solution, ready for placement in the training room
Standardize, structure and complement hands-on skills training
Unique instrument haptic feedback system
Exercise modules training for basic skills and clinical procedures
Extensive educational content
Customizable training courses

Work with a wide range of virtual laparoscopic instruments
High accuracy of laparoscopic instrument motion detection
Simultaneous motion tracking of the laparoscopic instruments
Laparoscopic instruments longitudinal motion and rotation tracking
User-friendly touchscreen interface

BENEFITS AT A GLANCE

MODELS
LAP-X II is available in two different models to accommodate different budgets, requirements and projects. Both models feature an ergonomic design and have an easy, intuitive and user-friendly touchscreen interface.

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INSTRUMENTS

Instruments required for different laparoscopic interventions are provided in the LAP-X II software. The instruments include a needle holder, bipolar scissors, forceps, a clip applier, a Maryland dissector, a coagulator, a sphere electrode, a LigaSure Atlas, an aspirator-irrigator device, an endobag extractor, an injection needle, a bipolar grasper, a needle electrode, an endoscope camera and more.

LAP-X II Expert*
LAP-X II Expert has a sophisticated and mobile design with a wheel cart and an electronically adjustable working height; the perfect solution for training rooms and skills centers.

Multiple instruments can be inserted and used simultaneously while performing laparoscopic procedures, and the instruments are interchangeable between the universal trocars. LAP-X II has a highly accurate motion detection system: the simulator features simultaneous longitudinal motion tracking as well as rotation tracking of the instruments in use.
MODULES

Basic Skills
- Control of camera with different viewing angles (0°, 30°, 45°)
- Hand coordination in space
- Instrument control skills
- Vessel clipping and capturing
- Endo clip applicator handling
- Instrument coordination in space
- Endoscopic scissor handling
- Electrocoagulation operating skills
- Movement of objects in space
- Capturing of objects in space
- Movement of pins and objects on pins
- Endoscopic scissors control in both examination and training mode

Suturing and knotting
- Square knot tying left hand
- Square knot tying right hand
- Surgical knot tying left hand
- Surgical knot tying right hand
- Interrupted (loop) suturing technique
- Needle orientation in the needle holder
- Needle suturing left hand
- Needle suturing right hand
- Square knot tying on a thread without needle
- Surgical knot tying on a thread without needle
- Z-suturing
- Z-stitch overlaying
- Mattress suturing

Salpingo Oophorectomy
- Reference mode

Gynecology surgery
- Tubal sterilization
- Tubal ligation procedure in the isthmic of the right tube / tubal ligation procedure in ampullar with active bleeding
- Tubectomy procedure

Prophylactic Oophorectomy
- Reference mode

Hysterectomy
- Complete procedure

Small bowel acute adhesive obstruction
- Acute intestinal obstruction, adhesion on ileum
- Acute intestinal obstruction, adhesion on jejunum

Diagnosis of abdominal cavity
- Ovarian cyst
- Ectopic pregnancy
- Appendicitis

Sigmoid Colon Resection
- Cutting vessels, mobilization and intersection of the sigmoid colon
- Anastomosis

Cholecystectomy
- Complete procedure
- Traction and dissection of the peritoneum
- Dissection of structures in Calot’s triangle
- Clipping and cutting of cystic artery and cystic duct
- Mobilization of the gallbladder

Hernioplasty
- Complete procedure

Splenectomy
- Reference mode

Appendectomy
- Complete procedure
- Acute phlegmonous appendicitis
- Acute appendicitis, abdominal effusions
- Gangrenous appendicitis with peritonitis

Nephrectomy
- Complete procedure

New modules will continue to be developed. Please contact MEDICAL-X for additional info.
SIMULATION BASED TRAINING

For medical trainees and students to acquire essential medical skills and knowledge, exposure to live patients in realistic environments is necessary. However, this exposure to live patients is only possible when optimal treatment and patient safety can be assured. The need for both exposure to patients and said patients’ well-being form a challenge in medical education; a challenge which can be addressed by using simulation based medical training.

Not only does simulation based training lead to enhanced experience and improved confidence, it also prepares healthcare professionals for real interventions by simulating these interventions and their circumstances and environments as realistically as possible, as well as by making unlimited repetition of procedures and interventions possible. Skills can be developed and refined, while simultaneously preparing extensively for exposure to live patients.

Medical training with simulation based courses allows healthcare professionals to acquire necessary skills and knowledge in a safe and efficient environment. Technical skills can be learned as well as measured and assessed, making it a valuable step to becoming a certified healthcare practitioner. Simulation based training provides an ethical, safe and effective platform for training surgical interventions, whilst protecting patients from unnecessary risks.

INDIVIDUAL- AND TEAM TRAINING

When training to become a certified healthcare professional, not only knowledge and technical skills, but also confidence, attitude and self-assessment are of the utmost importance. Repetitive individual training enhances these important elements, allowing the healthcare trainee to perform repetitive rule- and knowledge based behavioral training. Simulation based training has also shown to improve self-assessment by offering an enhanced statistical evaluation of performances. However, solely training individually is not enough. Patient care has grown to be more complex and extensive than ever. Not only procedural skills and medical knowledge are required from healthcare professionals, but also leadership skills and the ability to communicate effectively with their team and with patients are of growing importance. The training of each individual member of a medical team needs to be brought together: every person has a role to play, and team members need to learn to be aware of their role as an individual in a team. Team training can be performed during simulation training: simulation training has not only proven to be an efficient way of achieving technical proficiency, but also to be a valuable asset in the development of communication skills, leadership abilities and team work.

TYPES OF TRAINING

- Individual training
- Team training
- Technical skills
- Communication skills
- Leadership skills
- Team work
- Professionalism
- Clinical judgement

ABOUT MEDICAL-X

MEDICAL-X is a company specialized in the design, development, manufacturing, marketing and distribution of simulation products for medical teaching and training. MEDICAL-X is an innovative scientific company providing simulated training solutions in various medical specialties. Training exercises of MEDICAL-X’s simulators are developed with cutting edge technology combined with the professional input of expert physicians. The simulators fulfill the demand of healthcare professionals to be able to train clinical skills cost-effectively as well as time-effectively, in medical schools, universities, hospitals and skills centers outside the operating room and without risks to human patients.
TECHNICAL SPECIFICATIONS

LAP-X II Smart
- Laparoscopic simulator + computer
- Two monitors - one of them touch-screen
- Three wireless laparoscopic instrument imitators (optional: extra instruments)
- Endoscope imitator
- Dual key foot pedal - one pedal for dissection, one pedal for coagulation

- Dimensions: two ports of 23x16x30 cm, one port of 14x9x30 cm
- Electrical: 110-240 V

LAP-X II Expert
- Laparoscopic simulator with wheel cart, instrument holder and built-in computer
- Two monitors - one of them touch-screen
- Three wireless laparoscopic instrument imitators (optional: extra instruments)
- Endoscope imitator
- Dual foot pedal - one pedal for dissection, one pedal for coagulation

- Dimensions: 55x100x180 cm (height is electrically adjustable)
- Electrical: 110-240 V

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Official distributor of LAP-X II:

Version 176 - *Actual products may differ from shown hardware and software images