

## The Laparoscopic Surgical Skills programme: setting the European standard

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### Summary

This paper presents the overall outline of the Laparoscopic Surgical Skills programme (LSS) and the first level (LSS Grade 1 Level 1). In addition, preliminary results of the first LSS accredited courses are presented, of which one recently took place in Hospital Universitário de Santa Maria in Lisbon.

### Background

Recent reports on safety and quality of surgical performance, for example by the World Health Organisation, stress the urgent need for improvement of training, assessment, and accreditation for technology dependent surgical procedures such as laparoscopy. The traditional surgical education model (the residency-based master-apprenticeship system) proved to be unsuitable to train surgeons in laparoscopy, especially not in the early stages of training. The establishment of new working time restrictions in combination with medico legal and socio-economic considerations considerably reduced the amount of time available to train and supervise trainees.<sup>1</sup> Accreditation of surgeons mainly based on the number of procedures performed is no longer tenable. All of this together led to a paradigm shift in surgical training.<sup>2</sup> Currently, it is widely acknowledged that the first part of the training for laparoscopic surgery takes place outside the operating room, by training in a simulated setting using virtual reality, synthetic, and/or organic models. After this, training continues in the clinical setting while surgeons operate on patients under supervision of an experienced surgeon.

Laparoscopic Surgical Skills (LSS) is the answer to satisfy the needs of both the surgeons and the healthcare authorities. LSS is an initiative by the European Association for Endoscopic Surgery (EAES) to provide a standard to (re)credential surgeons to perform laparoscopic surgery effectively and safely.<sup>3</sup>

### The outline of LSS

LSS offers a standard for comprehensive performance assessment for training and education in laparoscopic surgery within a multi-level curriculum. It focuses on safeguarding the quality of performance in laparoscopic procedures and goes beyond the basic skills. LSS is the first standard that combines criterion-based assessment in the skillslab with clinical assessment of performance on indicator procedures. Within each LSS level, the assessment incorporates a sequence of tests to evaluate a surgeon's proficiency in cognitive skills, surgical technical skills, and judgment. To this end, web-based study material and examinations are combined with various hands-on simulation modalities, scenario-based assessment, and clinical performance assessment. All LSS assessments are criterion-based and very practise-oriented. LSS is developed for surgeons in training, surgical fellows, practising surgeons and other physicians who perform laparoscopic surgery or would like to do so. Eligible candidates can enrol either for the LSS assessment or for an LSS accredited course, of which

the LSS assessment is an integral part. This provides surgeons of all levels of expertise the opportunity to efficiently obtain LSS certification.

The LSS programme is divided into two grades. Grade I is divided into 2 consecutive levels and includes all basic laparoscopic skills and fundamental laparoscopic procedures. Grade II consists of several separate assessments each focusing on a specific advanced laparoscopic procedure, such as laparoscopic colon surgery or laparoscopic bariatric surgery. Each level within the LSS programme addresses specific index procedures. LSS Grade I Level 1 is aimed at cholecystectomy, appendicectomy, and diagnostic laparoscopy. Grade I Level 2 concentrates on laparoscopic suturing for procedures, with anti-reflux procedures (Nissen fundoplication), incisional hernia repair, repair of perforated duodenal ulcer, difficult cholecystectomy, and common bile duct (CBD) exploration as index procedures.

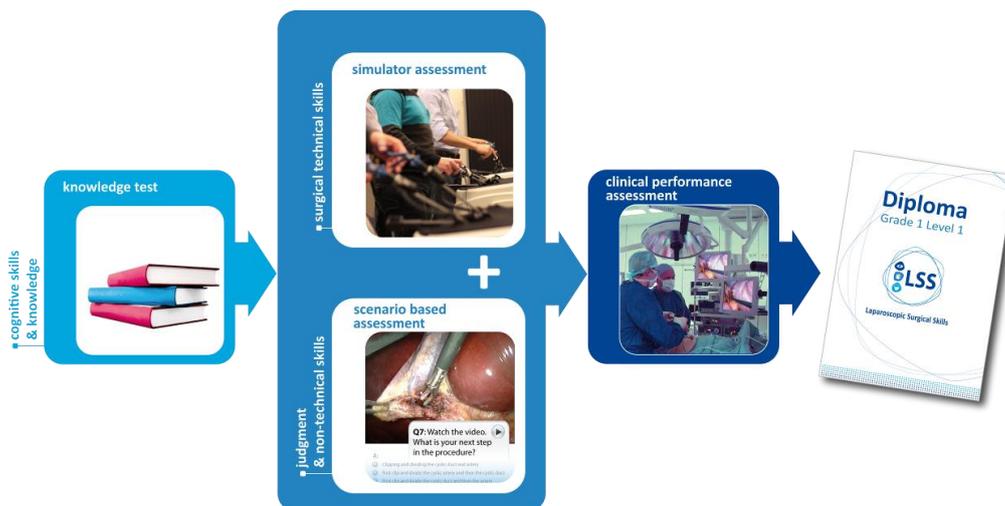


Figure 1. Schematic overview of the LSS assessment process.

## LSS assessments

To certify that the participating surgeons have reached the appropriate level of performance to obtain the LSS diploma, they need to pass several types of performance assessments (Figure 1).

### Knowledge test

Knowledge of procedures, techniques, instrumentation and ergonomics are important prerequisites for all laparoscopic surgeons. All participants who enrol for LSS are provided with the course documents describing the theory and knowledge that needs to be acquired on the index procedures corresponding to LSS level they entered. Amongst others, the participants need to possess knowledge of basic laparoscopic topics (Advantages, disadvantages & contra-indications; Safe access to the abdomen; Laparoscopic instrument handling; Electrosurgery in laparoscopy; Ergonomics) and procedure specific topics (Indications & contra-indications; Surgical anatomy; Ergonomics; Pre-operative considerations; The procedure; Tips & tricks; Post-operative care). Adequate acquaintance of the theory presented in the course documents is tested using a knowledge test. Passing this web-based exam is a requirement to be admitted to the scenario based assessment and simulator assessment.

### Simulator assessment

The simulator assessment certifies that participants have achieved a sufficient level of psychomotor and technical surgical skills to start performing the specific index procedures in the clinic under supervision of an acknowledged trainer. The LSS assessment focuses on procedural knowledge and skills, because possessing basic laparoscopic skills is essential before mastering the procedural skills, the simulator assessments of all LSS levels comprise some basic tasks as well. To pass the simulator

assessment successfully, the participant needs to reliably demonstrate sufficient performance of a selection of basic and procedural tasks on the assessment simulator. Passing the simulator assessment is required for admission to the clinical performance assessment.

For example for LSS Grade 1 Level 1 the simulator assessment consists of a basic task, three procedural tasks and one complete laparoscopic cholecystectomy procedure: Transferring pegs, Placing a ligating loop, Achieving Critical View of Safety, Clipping & cutting cystic duct & artery, Complete laparoscopic cholecystectomy procedure. For LSS Grade 1 Level 1 simulator assessment the LapMentor virtual reality simulator (Simbionix Ltd., Cleveland, OH, USA) is currently used.



*Figure 2. The simulator assessment for LSS Grade 1 Level 1.*

#### **Scenario-based assessment**

A scenario based assessment is conducted to assess the participants knowledge and judgment skills in regard to the index procedures. The assessment evaluates the participants understanding of the theory and judgments skills. The foundation of the assessment is based on the theory, procedural training and expert discussions as offered in LSS accredited courses. In the test several lifelike scenarios are presented with problems or questions at specific critical moments, which the participant has to solve successfully. Passing the scenario based assessment is required for admission to the clinical performance assessment.

#### **Clinical performance assessment**

After successful completion of the simulator assessment and scenario-based assessment, evidence for sufficient expertise in supervised clinical procedures is required. Each LSS level is therefore concluded by two steps for clinical performance assessment. Global Assessment Score (GAS) forms<sup>4</sup> are used to assess overall workplace performance in the index procedures, after which Competency Assessment Tool (CAT)<sup>5</sup> is used to analyse videos of two full-length recorded index procedures.

A credit-based system is used depending on the independency of the participant. Cases need to be supervised by an acknowledged trainer of the participants' unit. Each case needs to be assessed and signed off by the supervisor. To rate the clinical performance of the participant a Global Assessment Score (GAS)<sup>4</sup> is determined; the procedure is broken down into its main components and the supervisor scores the performance of each component. When participants have achieved the required grand total of points, they are invited to submit two unedited full-length video recordings of independently performed index procedures that are confirmed and signed off by the supervisor. These videos then are de-identified and sent to two independent LSS assessors, who will assess the videos using the Competency Assessment Tool (CAT)<sup>5</sup>.

### LSS assessment for established surgeons

Established surgeons holding a national board certification of completion of training (General Surgery) or an equivalent national diploma that enables them to practice independently, are required to submit logbook evidence of laparoscopic procedures performed. The core LSS faculty will then decide on an individual basis if they should enrol for the full assessment process or are directly eligible for the video-assessment.

### LSS accredited courses

All LSS accredited courses follow a goal-oriented and criterion-based approach that takes the training needs of each individual participant into account. The LSS assessment is an integral part of the course. LSS accredited courses are constructed around a vast amount of training on a combination of simulation tools and interactive expert discussions; offering a well-balanced mix of hands-on training and application of theory (Figure 3).

### Pre-course training

All participants who enrol for LSS are provided with the LSS course documents. Adequate acquaintance of the theory presented in the course documents is tested using a web-based knowledge test prior to the course. Possessing basic laparoscopic skills is essential before mastering the procedural skills. To get the most out of the course participants therefore are expected to start training their basic laparoscopic skills at their home institute prior to the course. The pre-course training can be done on any kind of validated simulator system offering basic laparoscopic skills training; box trainer, virtual reality, or augmented reality systems.

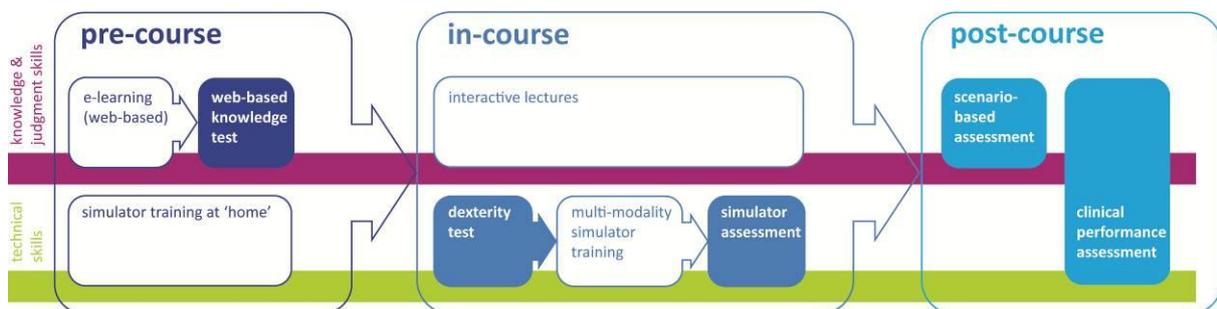


Figure 3. The structure of LSS accredited courses.

### In-course training

The hands-on training of LSS accredited courses commence with a baseline assessment of basic laparoscopic skills: the dexterity test. This test gives the participant and trainers insight in the baseline performance level of the participant. It also provides means to monitor the progression of the participants during the training. Performance benchmarks are offered as guidelines to support the pre-course simulator training.

A large portion of the course is allocated to repetitive hands-on training of basic and procedural laparoscopic skills on simulators. A mix of virtual reality simulation tools, box trainers (with synthetic or organic tissue) and augmented reality simulation tools is utilized in the courses. This variation of simulation modalities enlarges the transferability of skills and keeps repetitive training of basic skills interesting.<sup>6</sup> The hands-on training in the course is criterion-based to enlarge the effectiveness and efficiency of the training and the engagement of the trainees in their training.<sup>7,8</sup> Within the outlined course schedule the participants are able to adjust the hands-on training to their individual needs and training style. Participants who succeed in achieving the training benchmarks within the course should not have much difficulty to pass the simulator assessment. Passing the simulator assessment is required to take part in the clinical performance assessment.

### Expert discussions

Within the course, the expert discussions and case studies elaborate on the knowledge provided in the course documents. These interactive and open discussions are indispensable to strengthen the understanding of the theory and add to the judgment skills of the participants. A scenario based assessment is conducted to assess the participants knowledge and judgment skills in regard to the index procedures. Passing the scenario based assessment is required to take part in the clinical performance assessment.

### Current status and preliminary results

Currently, 47 surgeons are enrolled in LSS Grade 1 Level 1. These participants with 5 different nationalities took part in one of the five accredited courses that were offered in Eindhoven (the Netherlands), Kosice (Slovak Republic), and Lisbon (Portugal) between April 2011 and January 2012. The mean age of the participants was 31,2 years (sd 2,86) and the male/female ratio was 32/15. Most participants were first or second year residents (N=25), 6 participants already were established surgeons. The clinical experience in laparoscopy of the participants was rather limited (Figure 4) and in general matched the expertise level for which LSS Grade 1 Level 1 has been developed. All 47 completed the knowledge test, scenario based assessment, and simulator assessment and are currently in the phase of clinical training and assessment.

After the completion of the course, all participants were invited to fill in a (anonymous) course evaluation form in which they were asked to rate and provide feedback on different elements of the course. Overall, the participants rated the LSS Grade 1 Level 1 accredited courses with a 8,7 (sd: 0,78) on a scale of 10. The applicability of the course content in practice and the variation between theory and hands-on training were also rated very well (mean 8,8 (sd: 1,01) and 8,1 (sd: 0,80) respectively).

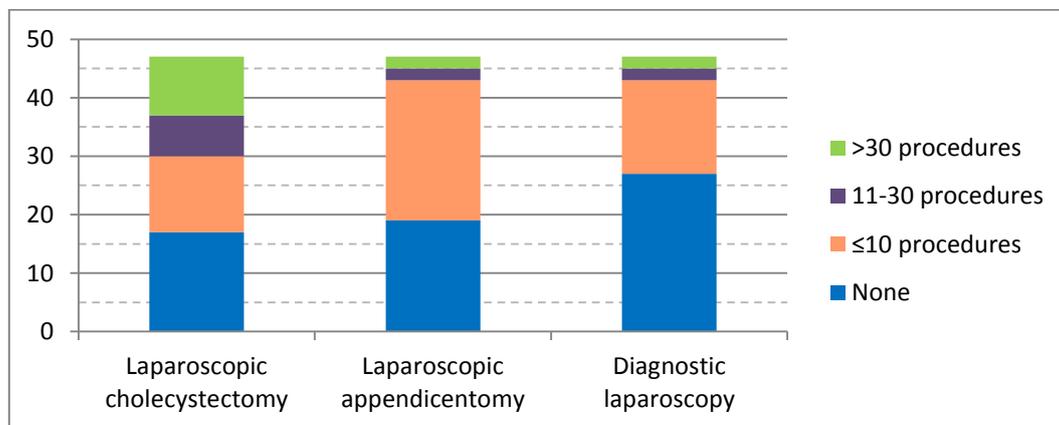


Figure 4. Number of clinical procedures (partly) performed as lead surgeons prior to the course.

### Further developments

While the higher levels of the programme are still in the development phase, the LSS Grade 1 Level 1 is running in more and more training centres throughout Europe. For spring 2012 LSS Grade 1 Level 1 accredited courses are scheduled amongst others in Trondheim (Norway), Munster (Germany), Istanbul (Turkey), Eindhoven, and Rotterdam (the Netherlands). For the complete overview of LSS accredited courses and LSS assessment possibilities please check [www.lss-surgical.eu](http://www.lss-surgical.eu) or contact the LSS office.

### Become an LSS accredited training centre

Your training centre can become a LSS accredited training centre too! All training centres who run courses for laparoscopic surgery are invited to apply. There are specific accreditation requirements that need to be fulfilled to warrant the contents and quality of LSS accredited courses and the LSS

assessment. Still, training centres are free to make a selection of (validated) simulation tools used for the training. The LSS office issues the LSS diploma. For more information on how to become a LSS accredited training centre, please contact the LSS office.

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