

Fundamentals of Laparoscopic Surgery (FLS)

Goal: FLS is a comprehensive web-based education module that includes a hands-on skills training component and assessment tool designed to teach the physiology, fundamental knowledge, and technical skills required in basic laparoscopic surgery. Our goal is to provide surgical residents, fellows and practicing physicians an opportunity to learn the fundamentals of laparoscopic surgery in a consistent, scientifically accepted format; and to test cognitive, surgical decision-making, and technical skills, all with the goal of improving the quality of patient care.

Skills Training:

- Tuesday skills session will be dedicated to instruction and hands-on mentored practice on the FLS box trainers for PGY 2-3s
- Residents are advised to practice FLS tasks on their own time to ensure proficiency

Requirement:

- *PGY 3s are required to complete and pass this exam before December 31 of the academic year*
- See testing policy below

FLS Exam:

- Web-based multiple-choice exam
- Technical skills component on the FLS laparoscopic box trainer

PREPARATION TIPS:

Step 1: Read the **FLS Technical Skills Proficiency-Based Training Curriculum**
<https://www.flsprogram.org/wp-content/uploads/2014/02/Proficiency-Based-Curriculum-updated-May-2019-v24-.pdf>

Step 2: Read the **FLS Manual Skills Written Instructions and Performance Guidelines** to become familiarized with the 5 FLS tasks:
<https://www.flsprogram.org/wp-content/uploads/2014/03/Revised-Manual-Skills-Guidelines-February-2014.pdf>

Step 3: Complete the **FLS Modules/Surgical Fundamentals Online Didactic** to prepare for the written portion:

Overview: <https://www.flsprogram.org/contents-2/>

Create Account/Login: <https://fesdidactic.org/Default.asp>

Step 4: Practice, practice, practice!

LINK: <https://www.flsprogram.org/>

STANFORD TESTING POLICY:

This policy applies to: The General Surgery Residency Training Program

Name of Policy: FLS Testing

Effective Date: November 1, 2018

Our intent for the FLS testing requirement is to have all PGY-3s and above tested by the end of the calendar year (December 31). The GSEC has built in testing times for residents. The proctors will offer available dates and times to residents and they will be first come, first serve. If a resident does not select a date and time, the proctors will assign one. Residents must make their appointments, and we cannot tolerate any schedule changes. We recognize the multiple commitments that the residents have but because of the extensive resources required for FLS and FES programs and because these tests are high stakes exams required for ABS certification, we will be insistent on the residents making these appointments. The only exception is if you have to miss work for a personal or family emergency. A scheduled case in the OR or a busy clinic is not a reason to miss your exam. If an emergency occurs, Anita Hagan must be contacted. The residency program pays for the initial testing voucher (\$525). If a resident fails the exam, they are responsible for paying for the cost of a retake voucher (\$125). Passing FLS is a requirement in order to advance to the PGY4 year. If a resident fails their first attempt, they must schedule a practice session with Dr. Korndorffer prior to taking their retake exam.



FUNDAMENTALS OF LAPAROSCOPIC SURGERY™

Technical Skills Proficiency-Based Training Curriculum

Members of the SAGES FLS committee have developed this curriculum for use in residency training programs as a way to prepare for the FLS manual skills test. The training curriculum is proficiency based, whereby trainees are oriented to the materials and perform self-practice until expert-derived performance levels are reached. Residents may practice as much or as little as needed in order to acquire the skills incorporated into the FLS exam. This protocol has been shown to correlate with a uniform successful passing score according to the FLS technical skills testing criteria. We recommend this curriculum for all resident levels. Interns may benefit from mastering these skills early in their training, such that they are better prepared for opportunities in the operating room and can undergo additional training throughout their residency as needed. Similarly, using the curriculum with mid-level and senior residents will help ensure that all trainees have suitable skills to perform a wide array of laparoscopic procedures.

I. OVERVIEW OF TRAINING AND TESTING

A trainee should first be introduced to the FLS skills tasks by viewing the video tutorials, which can be found in module five of the FLS online didactics. The FLS Manual Skills Guidelines, available on the FLS website www.flsprogram.org, can be used to reference the instructions and parameters for each of the five skills tasks. Pre- and post-testing is recommended so that performance improvement can be tracked. Training can be done with or without coaching (some periodic coaching may be helpful, but is not necessary), as trainees are encouraged to rely heavily upon the video tutorials in a self-study fashion, thus minimizing the need for personnel resources.

The materials used for Task 1 (Peg Transfer), Task 4 (Suture with Extracorporeal Knot), and Task 5 (Suture with Intracorporeal Knot) in the FLS Exam and in this training curriculum are identical. Materials for Task 2 (Precision Cutting) and Task 3 (Ligating Loop) have been modified for training as detailed here.

The training gauze used in Task 2 is marked with two concentric circles, whereas the testing gauze has a single circular mark. This modification was necessary because the scoring system for the testing gauze does not lend itself to real-time evaluation. The double-circle training gauze should ONLY be used in training and the single-circle gauze is the ONLY gauze allowed for testing. When the double-circle gauze is used, ALL cuts must be made within the white space between the two circles. Any cut that deviates into either circle represents a violation of the error parameter of the proficiency-based curriculum.

For Task 3, trainees may only use reusable ligating loops in the training environment. The single use ligating loops are the ONLY ligating loops suitable for testing. When utilizing a reusable ligating loop, trainees should use a Maryland Dissector to simulate cutting the ligating loop at the end of the task. The knot on the reusable ligating loop can then be loosened and slid back to its original location so that the ligating loop may be used again.

The training score sheet (found at the end of this document) and materials as described above should be used within the context of the proficiency-based curriculum (reaching proficiency levels according



to the specified protocol). The proficiency levels were derived from the mean performance of two experts who performed five repetitions of each task; the data were suitably homogeneous as there were no outliers (> 2 s.d. beyond the mean) and no trimming was required. These expert-derived performance levels have been tested in a multi-institutional fashion and have been determined to be suitable endpoints for training, as they were uniformly achievable with practice for novices without prior operative exposure. Moreover, following this proficiency-based curriculum, all trainees successfully passed the skills portion of the FLS exam. Note the data reported regarding time allocation and resources needed are for complete novices; less time and fewer resources may be required for more advanced learners or individuals with prior simulator experience. The goal of this curriculum is to teach trainees FLS laparoscopic skills in an effective and efficient format, in order to achieve a 100% pass rate on the FLS skills test.

The written portion of the FLS program can be taught using the FLS online didactics and is not covered in the scope of this skills curriculum although FLS certification requires mastery of the cognitive material as well.

II. INTRODUCTION AND PRE-TEST (RECOMMENDED)

Objective

Familiarize all trainees with the FLS trainer box, supplies, setup, instrumentation, FLS Manual Skills Guidelines, and online video tutorials as well as to establish and document a trainee's baseline performance.

Introduction

Each trainee watches the videos contained in module five of the FLS online didactics for all 5 tasks.

Pre-test

1. Each trainee watches each task on FLS online module five immediately prior to testing.
2. Each trainee performs one repetition of Task 1 immediately following the viewing of the video and records it on the training scoresheet.
3. Repeat steps 1 and 2 above for the remaining four tasks until each trainee has performed one repetition of all five tasks, in order (Task 1, then Task 2, then Task 3, etc.).

Time requirements

15 minutes for Introduction, 45 minutes for the pre-test, one hour total.

Personnel Requirements

One hour per trainee. Pre-test can be administered by a skills lab technician, skills/sim lab instructor, or residency program director.

Materials

FLS online didactics (module five), FLS trainer box with connected monitor, required instruments and supplies, stopwatch, and training scoresheets.

Timing

The Introduction and Pre-test should be conducted prior to training.



III. TRAINING

Objective

For all trainees to practice a sufficient amount to demonstrate proficiency for all tasks.

Training Protocol and Proficiency Levels

Training should be performed in a self-study fashion with a heavy reliance on the video tutorials. Additional feedback may be given on an as-needed basis, especially if a trainee is having difficulty achieving the proficiency levels. Performance should be monitored by regularly reviewing the progress of each trainee. Each trainee should practice each of the five tasks in order (Task 1 until proficiency is achieved, then Task 2, then Task 3, etc.). The performance of each repetition can be recorded using the included training scoresheet or using a spreadsheet of one's own creation. FLS-approved training supplies (including double-circle gauze for Task 2 and reusable ligating loops for Task 3) should be used. Proficiency-based training should be conducted using the performance levels and the protocol listed below.

Task 1: Peg Transfer

The task should be practiced until it can be performed in 48 seconds with no objects dropped outside of the field of view. This level of performance should be achieved on two consecutive repetitions and then again on 10 more nonconsecutive repetitions for reinforcement. If a trainee cannot achieve this level of performance in 80 repetitions, that trainee should proceed to Task 2.

Task 2: Precision Cutting

The task should be practiced until it can be performed in 98 seconds with all cuts made within the section between the two lines of the training gauze. This level of performance should be achieved on two consecutive repetitions or for a maximum of 80 repetitions.

Task 3: Ligating Loop

The task should be practiced until it can be performed in 53 seconds with up to 1mm accuracy errors. This level of performance should be achieved on two consecutive repetitions or for a maximum of 80 repetitions.

Task 4: Suture with Extracorporeal Knot

The task should be practiced until it can be performed in 136 seconds with up to 1mm accuracy errors. This level of performance should be achieved on two consecutive repetitions or for a maximum of 80 repetitions.

Task 5: Suture with Intracorporeal Knot

The task should be practiced until it can be performed in 112 seconds with up to 1mm accuracy errors. This level of performance should be achieved on two consecutive repetitions and then again on 10 more nonconsecutive repetitions for reinforcement or for a maximum of 80 repetitions.



The proficiency levels and the training protocol are summarized in the table below.

Task	Task Name	Proficiency Level*	Seconds	Allowable Errors	Repetitions**
1	Peg Transfer	mean	48	no drops outside field of view	2 consecutive + 10 nonconsecutive
2	Precision Cutting	mean + 2 s.d.	98	all cuts between 2 circles of the training gauze	2 consecutive
3	Ligating Loop	mean + 2 s.d.	53	up to 1mm accuracy error allowed	2 consecutive
4	Suture with Extracorporeal Knot	mean + 2 s.d.	136	up to 1 mm accuracy error allowed	2 consecutive
5	Suture with Intracorporeal Knot	mean + 2 s.d.	112	up to 1mm accuracy error allowed	2 consecutive +10 nonconsecutive

*Based on expert-derived performance

**Maximum number of repetitions is 80

Training Schedule

For optimal benefit, training should be conducted in a distributed fashion with a maximum duration of one to one and a half hours per session. A maximum of two sessions per day may be conducted, but additional training during a single day should be avoided in order to minimize fatigue. Ideally, one-hour training sessions may be held up to several times per week and conducted for as long as necessary to complete the curriculum.

Training Duration

Since this is a proficiency-based curriculum, the duration of training will vary, as individuals will have variable levels of prior experience and will achieve proficiency at different rates. For complete novices, skill acquisition requires, on average, 10 hours of practice with a range of 6-14 hours. For more advanced trainees, less time may be needed. A sign-in log may be helpful to track training duration.

Number of Repetitions and Materials

Similar to training duration, the number of repetitions to reach proficiency will vary according to individual rates of skill acquisition. Listed below are the mean number of repetitions required to demonstrate proficiency according to the protocol described above, along with the range in parentheses. These data are for complete novices and fewer repetitions may be required for more advanced trainees. These data may assist the instructor in allotting sufficient consumable materials including training gauze for Task 2, reusable ligating loops for Task 3, and suture for Tasks 4 & 5. With regard to reusable materials, Task 1 requires the Peg Transfer model which can be used repetitively without replacement, Task 2 only requires replacement of the training gauze, Task 3 requires replacement of the foam model after approximately 25 repetitions and replacement of the reusable ligating loop after approximately 10 repetitions. Tasks 4 & 5 require replacement of the Penrose drain and suture after approximately 10-15 repetitions provided the suture is not cut during the task. Sufficient laparoscopic instrumentation should be on hand as well so that malfunctioning equipment may be easily replaced.

Task 1	Task 2	Task 3	Task 4	Task 5	TOTAL
57 (26-80)	18 (4-31)	8 (2-36)	7 (3-14)	28 (15-52)	119 (66-161)



IV. POST-TEST (RECOMMENDED)

Objective

Document final performance.

Post-test

Post-testing is recommended in order to track improvement but is optional.

1. Each trainee performs one repetition of each of the five tasks with each repetition recorded on the training scoresheet (found at the end of this document).

Time Requirements

30 minutes per trainee

Personnel Requirements

The post-test can be administered by a skills lab technician, skills/sim lab instructor, or residency program director.

Materials

FLS Manual Skills Guidelines, FLS trainer box and connected monitor, required laparoscopic instrumentation and supplies, stopwatch, and training scoresheet.

Timing

The post-test should be conducted after documented completion of the training curriculum.

Developed by:

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E. Matt Ritter, MD, FACS – Uniformed Services University, Bethesda, MD



FLS Skills Training Scoresheet

Date:	
Trainee:	

Follow the instructions for each task using the videos in module 5 of the FLS online didactics

Peg Transfer Task		
Equipment	2 Maryland Dissectors, peg board, 6 rubber objects	Trainee Performance
Timing starts	First object is touched	_____ min _____ seconds _____ #of object dropped outside field of view
Timing stops	Last object is released	
Proficiency level	Completed in 48 seconds with no objects dropped outside the field of view	

Precision Cutting Task		
Equipment	1 Maryland Dissector, 1 pair endoscopic scissors/shears, jumbo clip, 1 double-circle gauze piece	Trainee Performance
Timing starts	Gauze is touched	_____ min _____ seconds All cuts within the lines? YES NO
Timing stops	Circle is release from gauze frame	
Proficiency level	Completed in 1 minute 38 seconds, all cuts within the two marked circles	

Ligating Loop Task		
Equipment	1 Maryland Dissector OR 1 locking grasper, 1 pair endoscopic scissors/shears, 1 reusable ligating loop, 1 jumbo clip, 1 red foam organ	Trainee Performance
Timing starts	First instrument enters field of view	_____ min _____ seconds Loop is secure? YES NO Loop is _____ mm away from mark on appendage
Timing stops	End of suture material is cut (simulated using Maryland Dissector instead of scissors)	
Proficiency level	Completed in 53 seconds, loop is securely around appendage. Loop is within 1mm of the marked line	



Extracorporeal Knot Task		
Equipment	1 Maryland Dissector and 1 laparoscopic needle driver OR 2 laparoscopic needle drivers (cannot be self-righting), 1 knot pusher (open or closed), 1 pair endoscopic scissors/shears, 1 90cm silk suture (SH needle), 1 Penrose drain, 1 suture block	Trainee Performance
Timing starts	First instrument enters field of view	_____min _____seconds
Timing stops	Both ends of suture material are cut	Knot is secure? YES NO
Proficiency level	Completed in 2 minutes, 16 seconds, suture entered in Penrose drain within 1mm of the dots, slit in drain is closed, knot is secure (not slipping, no air knots).	Slit in drain is closed? YES NO Suture is _____mm away from dots Drain was avulsed from foam block? YES NO

Intracorporeal Knot Task		
Equipment	2 laparoscopic needle drivers (cannot be self-righting), 1 pair endoscopic scissors/shears, 1 15cm silk suture (SH needle), 1 Penrose drain, 1 suture block <i>*reuse suture from previous task and cut down to 15 cm</i>	Trainee Performance
Timing starts	First instrument enters field of view	_____min _____seconds
Timing stops	Both ends of suture material are cut	Knot is secure? YES NO
Proficiency level	Completed in 1 minute 52 seconds, suture entered in Penrose drain within 1 mm of the dots, slit in drain is closed, knot is secure (not slipping, no air knots).	Slit in drain is closed? YES NO Suture is _____mm away from dots Drain was avulsed from foam block? YES NO

Important Scoring Information

The manual skills component of the FLS exam is intended to measure your technical skills during basic laparoscopic surgical maneuvers. These five tasks, designed by Dr. Gerald Fried and customized for the FLS Program, are based on the MISTELS program developed at McGill University and have been extensively tested to ensure that they reflect the technical skills that are fundamental to the performance of laparoscopic surgery. All tasks are demonstrated in the FLS didactic curriculum (Module 5) and each task must only be performed once during the test.

Scoring. The five skills tasks are timed and a maximum time limit has been set for each task. For all tasks, both time and accuracy are measured for performance and high scores result from tasks performed efficiently and without error. Penalties are assessed for specific errors and lack of precision. **Reaching or exceeding the maximum time results in a score of ZERO for that particular task. You will be asked to stop if you reach the maximum time limit without completing the task. Completing the task under the maximum time limit does not guarantee a passing score for that task.** Each task has its own scoring formula based upon a combination of time and accuracy measures. The scores for the tasks are normalized so that they contribute equally to the total manual skills assessment score.

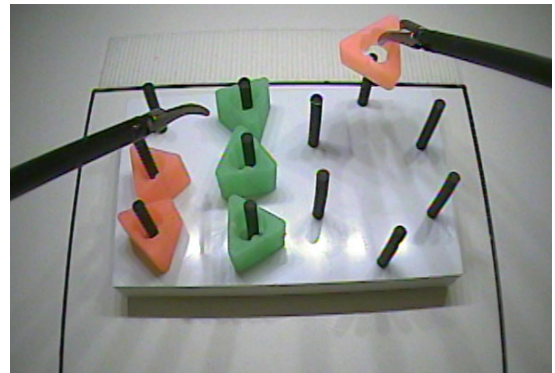
Task One: Peg Transfer

Equipment: Two Maryland dissectors, one pegboard, six rubber ring objects

Maximum time limit: 300 seconds

Center the pegboard on the lower Velcro strip in the center of the marked square on the floor or base of the trainer. All six colored objects should be aligned on the six pegs on the same side of the board as your non-dominant hand (It does not matter which peg pattern-parallel or circular- is on the left or right side of the test taker). Adjust the camera as necessary to make sure the field of view is centered on the pegboard and the entire pegboard is visible.

To perform this task, grasp each object with your Non-dominant hand, and transfer the object mid-air to your dominant hand. You will then place the object on a peg on the opposite side of the pegboard. There is no importance placed on the color or order in which the six objects are transferred. Each transfer must be mid-air without using the board or pegs for assistance. Once all six objects have been transferred to the opposite side of the board, reverse the process and first grasp each object with your dominant hand, transferring mid-air to your non-dominant hand, and placing it on the original side of the pegboard. A penalty is assessed if an object is dropped outside of the field of view or depending on the angle you can no longer retrieve the object. You will not be allowed to retrieve the object if it is dropped outside of the field of view. If this occurs, continue the task with the remaining objects. There is no penalty for dropping the object within the field of view, unless you are not able to retrieve it. If you can retrieve it, pick the object up with the hand it was dropped with and continue the task. The drop cannot be used as the transfer point. Timing for this task begins when you touch the first object. Timing ends upon release of the last object. A video demonstration of this task, along with all the tasks described below, is included in Module Five of the FLS didactic curriculum.



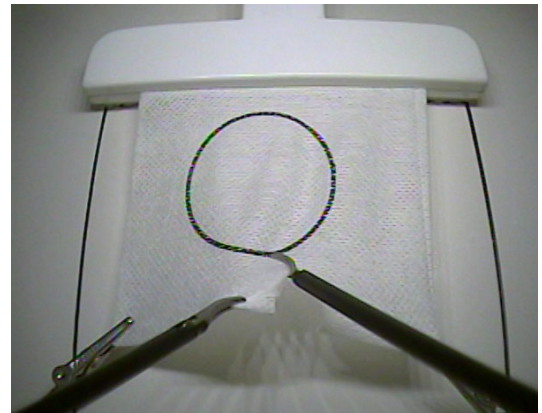
A penalty is assessed if an object is dropped outside of the field of view or depending on the angle you can no longer retrieve the object. You will not be allowed to retrieve the object if it is dropped outside of the field of view. If this occurs, continue the task with the remaining objects. There is no penalty for dropping the object within the field of view, unless you are not able to retrieve it. If you can retrieve it, pick the object up with the hand it was dropped with and continue the task. The drop cannot be used as the transfer point. Timing for this task begins when you touch the first object. Timing ends upon release of the last object. A video demonstration of this task, along with all the tasks described below, is included in Module Five of the FLS didactic curriculum.



Task Two: Precision Cutting

Equipment: One Maryland dissector, one pair of endoscopic scissors, one jumbo clip, one 4x4 piece of gauze with a pre-marked circle, two alligator clips (attached to the bottom of the trainer box)
Maximum time limit: 300 seconds

Place the two-ply piece of gauze with a single marked circle into the jumbo clip. The circle pattern should be facing up, with the open edge inside the jumbo clip, and the folded edge on the opposite side, closest to you. Make sure that the entire marked circle is outside of the clip. Place the clip with the gauze onto the upper Velcro strip located on the bottom of the FLS trainer. This is the Velcro strip located outside of the marked square. Use the alligator clips attached to the bottom front corners of the trainer with string to secure the bottom two corners of the gauze. Tighten the strings as needed so that the gauze is taut and suspended slightly above the bottom of the trainer. Make sure the camera is centered on the gauze so that the entire piece of the gauze is in the field of view.



Using the Maryland dissector in one hand, you will provide traction to the gauze, placing it at the best possible angle to the cutting hand. Using your endoscopic scissors in the other hand, you will cut into the gauze and then along the pre-marked circle until it is completely removed from the 4x4 gauze piece. The gauze is two-ply; however only the top marked layer will be scored, so, cut as much or as little of the bottom layer of the gauze as desired. The objective is to complete the task accurately in as little time as possible. A penalty is assessed for any cuts deviating from the line demarcating the circle, whether made inside or outside the marked circle. Remember, you must start cutting from an edge of the gauze and you may switch hands with your instruments at any time during the task.

If gauze comes out of the jumbo clip during the task, you must continue the task without reattaching the gauze. Timing for this task begins when the gauze is touched. Timing ends upon the marked circle being completely cut out from the gauze piece.

Single circle gauze will be used for the FLS Exam. Double circle gauze is available for purchase as well, but is only to be used for practice.

Task Three: Ligating Loop

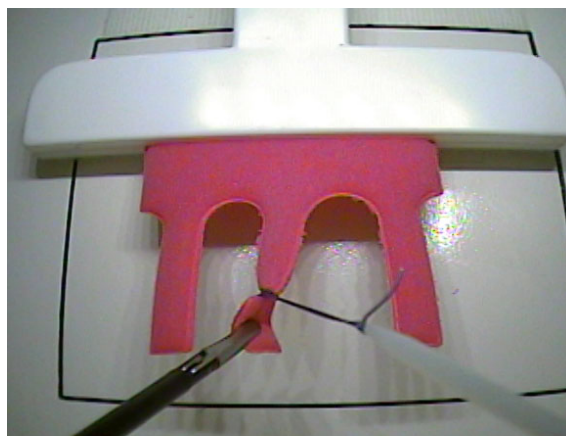
Equipment: One grasper (choice of one Maryland dissector or one grasper with locking or ratcheted handle), one pair of endoscopic scissors, one jumbo clip, one pre-tied ligating loop or endoloop, one red foam organ with appendages.
Maximum time limit: 180 seconds

Place the foam organ into the jumbo clip with the three appendages hanging out the bottom of the clip, with approximately half an inch of the organ inside the mouth of the clip. Place the clip onto the lower Velcro strip that is located inside the black marked square on the bottom of the FLS trainer. Make sure



the organ is centered in the field of view. You may need to adjust the camera to make sure there is at least half an inch of viewing area below the end of the organ's three appendages.

In this task, you are required to place a pre-tied ligating loop or endoloop around the provided mark on the middle appendage of the foam organ. Using your grasper or Maryland with one hand and the pre-tied ligating loop in the other, you will position the loop around the appendage at the provided mark. Once the loop is positioned, you will break off the end of the plastic pusher at the scored mark on the outside of the trainer. Next, you will secure the knot on the mark near the base of the foam appendage by sliding the pusher rod down. You will complete the task by cutting the end of your loop material inside the trainer. A locking grasper may be used to enable the use of two hands to manipulate the ligating loop. A penalty is assessed for any deviation of the knot from the mark on the foam appendage or if the knot is not secured on the appendage. Do not break or preload the ligating loop prior to beginning the task. Timing for this task begins when either the instrument or the loop material is visible on the monitor. Timing ends when you have cut the end of your loop material inside the trainer.

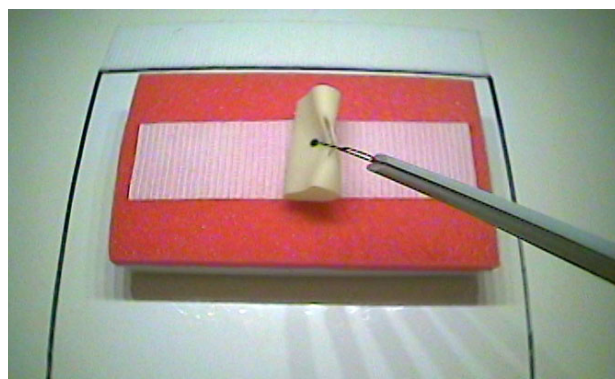


Task Four: Suture with Extracorporeal Knot

Equipment: Two needle drivers (or choice of one needle driver and one Maryland dissector), one knot pusher (either open or closed), one 2-0 silk suture of 90cm or 120cm length, one pair of endoscopic scissors, one penrose drain with marked targets, one suture block. Note: self-righting needle drivers and hemostats are not permitted.

Maximum time limit: 420 seconds

Place the foam suture block onto the Velcro strip inside the black marked square on the bottom of the FLS trainer, so that the Velcro strip on the suture block is horizontal, with the foam side up. Center a penrose drain securely onto the Velcro strip on the suture block, so that the slit in the penrose drain is vertical. Adjust the camera as necessary so that there is equal viewing area on all sides of the suture block.



In this task, you will place a long suture through the two marks in the penrose drain and then tie three single throws of a knot, extracorporeally, using a knot pusher to secure each throw onto the penrose drain, thus, closing the slit. Once all three throws have been secured onto the penrose drain, cut both ends of the suture inside the trainer. The ends may be cut together or separately and the tail length is not important for this task. The suture must be grasped by the thread and NOT the needle when introducing it into the trainer. Once inside the trainer, the needle may be placed through the drain in one motion, or two or more motions. Penalties are assessed for any deviation of the suture material



from the two marks on the penrose drain, for not properly closing the slit in the drain, and for a knot that slips or comes apart when tension is applied to it. Take care not to avulse or separate the penrose drain from the suture block as this is an automatic failure of the task. Timing for this task begins when your first instrument is visible on the monitor. Timing ends when you have cut both ends of your suture inside the trainer.

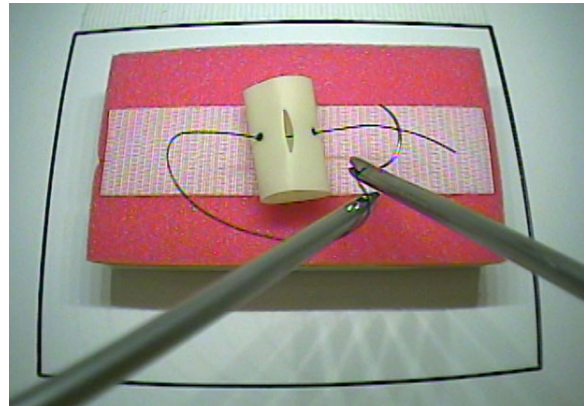
Task Five: Suture with Intracorporeal Knot

Equipment: Two needle drivers, one 2-0 silk suture of 15 cm length, one pair of endoscopic scissors, one suture block, one penrose drain with marked targets. Note: self righting needle drivers are not permitted.

Maximum Time Limit: 600 seconds

Place the foam suture block onto the lower Velcro strip inside the black marked square on the bottom of the FLS trainer, so that the Velcro strip on the suture block is horizontal with the foam side up. Center a penrose drain securely onto the Velcro strip on the suture block, so that the slit in the penrose drain is vertical. Adjust the camera as necessary so that there is equal viewing area on all sides of the suture block.

For this task you will need to place a short suture through the two marks in a penrose drain and then tie three throws of a knot intracorporeally, in order to close the slit in the penrose drain. The first throw must be a surgeon's knot or double throw, followed by two single throws. You must exchange hands with your needle, or needle end of the suture, between each throw to ensure you are tying each throw with the opposite hand. You may start tying with either hand. Once all three throws have been secured onto the penrose drain,



cut both ends of the suture inside the trainer. The ends may be cut together or separately and the tail length is not important for this task. The suture must be grasped by the thread and NOT the needle when introducing it into the trainer. Once inside the trainer, the needle may be placed through the drain in one motion, or two or more motions.

Penalties are assessed for any deviation of the suture from the two marks on the penrose drain, for not properly closing the slit in the drain, and for a knot that slips or comes apart when tension is applied to it. Take care not to avulse or separate the penrose drain from the suture block as this is an automatic failure of the task. Timing for this task begins when your first instrument is visible on the monitor. Timing ends when you have cut both ends of your suture inside the trainer.

Please review the video demonstration of this task and all other tasks, included in Module Five of the FLS didactic curriculum for additional guidance.

