

Laparoscopic Simulation Training Manual for Obstetrics and Gynaecology Trainees in Scotland

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Context

Access to surgical training in gynaecology has always had its challenges however this has been compounded by the Covid-19 pandemic which has had wide ranging implications at all stages of training in Obstetrics and Gynaecology. In recognition of this NHS Education for Scotland has endeavoured to support trainees to maximise their learning potential, which includes the use of laparoscopic simulators. A number of simulators have been purchased by the Scottish deanery and have been distributed to the regional Training Programme Directors.

Trainees should feel empowered to take charge of their own training and maximise any learning opportunities that come their way. This document has been created as a resource to support all O+G trainees to extract maximum benefit from both their time on laparoscopic trainers but also any precious theatre time. It has been compiled by current trainees with an interest in medical education and laparoscopic operating along with NES to support the roll out of the laparoscopic simulators.

Within this manual you will be directed to other sources of information to support self-directed learning, alongside helpful hints and tips. A suggested logbook has been included to facilitate record keeping of any time spent on both the simulator and in theatre to support your training. In addition, you will find links to exemplar videos of suggested training exercises to develop your skills.

Why bother with simulation?

Whether you want to be the next Minimal Access Surgeon or are aiming to be a Fetal Medicine Specialist, improving your laparoscopic skills will benefit your training and future career. The aim of this manual is that it is used as an adjunct for the laparoscopic simulators alongside real-life surgical experience to allow you to achieve the requirements for ARCP, and more importantly to develop the skills required for life post-CCT.

The beauty of gynaecological laparoscopy is the ability to train on a simulator. Simulators provide a great opportunity to develop your skills and remove much of the stress of discussion around “talent/aptitude” – nobody knows whether you have spent 10hrs or 40hrs on the simulator practising a specific skill such as laparoscopic suturing. The key thing is that if you put in the time on the simulator you are much more likely to be given the opportunity to suture in the operating theatre.

Time is your most precious non-renewable resource. During training there are many competing demands on your time, so it is important that you maximise every opportunity. By following the hints and tips in this manual and practising the suggested exercises it is hoped that your laparoscopic skills will improve significantly.

Matrix Requirements

Table of OSATs

| Skill | Example | ARCP year required |
|-------------------------------------|--|--------------------|
| Diagnostic laparoscopy | | ST4 |
| Simple operative laparoscopy | Tubal ligation Adhesiolysis Drainage of ovarian cyst | ST5 |
| Lap management of ectopic pregnancy | | ST7 |
| Ovarian cystectomy | NB can also be open | ST7 |

Top Tips

- Be proactive at getting Diagnostic Laparoscopy signed off as part of larger procedures
 - If you are a more senior trainee, let the junior trainee do the Dx lap before you take over for the operative component
- The salpingectomy component of a TLH is useful practice for an ectopic
- OSATs can now be gained from simulators
 - Make sure you get them completed if you are doing a course
 - The OSAT can be formative or summative for a specific skill e.g. suturing. It must be declared on the OSAT that this has been performed on a simulator
 - An OSAT performed on a simulator cannot assess all the other components of a procedure such as communication in theatre, laparoscopic entry etc.
- Use a simulator prior to your theatre list to “warm-up”
- VE patients undergoing a TLH/endometriosis surgery to help build your skills at recognising deep endometriosis or other signs that suggest the surgery will be challenging

Knowledge Resources

This manual is not designed to teach you everything you need to know to be a laparoscopic surgeon. This section is here to remind you that there are other sources of knowledge that you are encouraged to seek out to complement your simulator sessions.

a. Theoretical Knowledge

Training on a laparoscopic simulator can feel a bit removed from the “real-life” experience of operating. It is very important to think about all aspects of surgery not simply the technical skills of the procedure itself. This manual is very much focussed on those technical skills but in order to translate these skills to the operating theatre you must ensure your general surgical knowledge is also up to date. There are 2 modules on the RCOG eLearning site which are a good starting point:

- eLearning and Teaching for Basic Laparoscopic Surgery (within the Technical Skills section)
- Minimal Access Surgery (within the Surgical Procedures and Postoperative Care section of the Core Knowledge)

b. Anatomy and Exemplar Procedures

There are excellent videos on anatomy and surgical procedures online.

- <https://websurg.com/en/>. Registration is free and in addition you can access the knowledge component of the WINNERS program. These include some excellent tutorials on, amongst others, principles of laparoscopy, laparoscopic set up, use of energy, suturing, complications and hysteroscopy. Anatomy tutorials are advanced but useful.
- <https://www.bsge.org.uk/video-library/> - for BSGE members. The extensive collection of videos ranges from entry techniques and suturing to extensive resection of deep endometriosis
- YouTube – Clearly anyone can upload a video so be mindful of the lack of quality control and the influence of industry when viewing any video. It is an excellent opportunity to be aware of alternative ways of operating which can then be discussed with colleagues to build a deeper understanding of various surgical techniques. A couple of interesting examples (no comment on quality):
 - Dr Mishra: numerous surgical videos, often avoiding the use of expensive disposable kit: <https://www.youtube.com/user/laparoscopyhospital>
 - A nice Australian TLH video that shows you shots of operators’ hands and a split screen with the laparoscopy: <https://www.youtube.com/watch?v=wggV57Nkxuw>

c. Webinars and Other Online Resources

In addition to WebSurg for anatomy and procedures many of the benign gynae organisations are running webinars which have useful updates from experts.

- British Society of Gynaecological Endoscopy (BSGE): <https://www.bsge.org.uk/bsge-webinar-series/>. Monthly webinars. Available to members only
- European Endometriosis League (EEL): <https://euroendometriosis.com/eel-webinars-2021/> Monthly evening webinars, free to non-members
- European Society for Gynaecological Endoscopy (ESGE): <https://esge.org> do some online workshops (though usually need to pay a small fee)

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- European Society of Human Reproduction and Embryology (ESHRE): <https://ecampus.eshre.eu/local/coursecatalog/?size=32&date=new&yearloc=2021> On demand access to previous online webinars and e-campus courses. Available to members only
- World Endometriosis Society (WES): <https://endometriosis.ca> On demand access to all the recent world congress
- Society of Endometriosis and Uterine disorders (SUED): <https://seud.org> online webinars/masterclasses every two months free to non-members
- Olympus, Ethicon and Storz also offer online masterclasses which are usually free.

d. Structured Educational Programmes

BSGE RIGS HUB program

<https://www.bsge.org.uk/rigs-hubs-national-training-programme/>

This is only available to BSGE members but the program itself is free (and probably justifies your membership fee in itself). This is a centralised, standardised BSGE programme, that is delivered through hands on workshops at laparoscopic hubs within each deanery and online webinars. There are 3 programme streams (Basic, Intermediate and Advanced) and the content aligns with the requirements of the core RCOG curriculum. At present in Scotland there are two training hubs (Ninewells and Glasgow) and for each stream there are 3 hands on workshops. The 2021 program is now closed, the 2022 will be advertised later in the year – there are 10 places per stream per hub – i.e. 60 places across Scotland each year.

Ethicon and Olympus courses

<https://www.bsge.org.uk/bsge-ethicon-laparoscopic-gynaecology-training-programme/>

<https://www.bsge.org.uk/bsge-olympus-blended-learning-laparoscopic-gynaecology-skills-development-programme-2021/>

These are available to ST5-7 and are usually only 12 places each. They are competitive entry but a fantastic training opportunity and are free.

They each run over a year and both offer a mixture of skills sessions, theory sessions, cadaveric course and in previous years the Ethicon course included a trip to Hamburg for a day operating in the porcine lab. In addition, you get a trainer loaned to you. All travel/accommodation etc is paid for. Several Scottish trainees have participated over recent years.

GESEA Programme

<https://europeanacademy.org/certification/gesea-programme/>

The Gynaecological Endoscopic Surgical Education and Assessment (GESEA) programme is a structured diploma programme for Gynaecological Endoscopy. There are two levels to the programme – Bachelor (suitable for those early on in training but also for more advanced trainees, particularly those largely obstetric focussed, that are keen to augment their gynae skills) and Masters (trainees planning or currently undertaking surgical focussed ATSMs or subspecialty training). It consists of eLearning (free to access via the Websurg platform, see above), laparoscopic simulation and certification.

The certification session creates a “high stakes” situation where one has to perform fine motor skills and exam pressure, which may replicate some of the real life intra-operative stressors. The certification

can also be a driver for those that are deadline/exam orientated to set aside the time for simulation practise. There is a fee for the certification sessions.

One can view the certification exercises on <https://id-trust-medical.eu/downloads/> under the “Instructions” power point for each of the 3 exercises (“LASTT, SUTT and HYSTT”). There are instructions and embedded videos.

Preparation for the certification: It is worth ensuring a course or session on the actual exercises themselves before certification, but the below ideas are good options practice for some parts in interim:

- Put dots onto a foam make up sponge (not a puff) in the pattern of the certification level you are attempting. If the angle of your needle loading or suturing is poor, the pad will tear.
- Practice manipulating small beads as suggested in the Intermediate Tasks below

e. Societies to Consider Joining

If you are interested in gynaecology, then membership of a professional society can be extremely beneficial. Below are a few suggestions which have resources for developing your laparoscopic skills.

British Society for Gynaecological Endoscopy (BSGE)

<https://www.bsgge.org.uk/join-us/>

The BSGE is an excellent resource and current and previous trainees have found membership extremely beneficial. The cost is £80/year for trainees (which is tax deductible as it is a professional society)

Benefits include:

- Access to resources such as surgical videos
- Heavily subsidised courses
- BSGE RIGS HUB National Training Programme – centralised, standardised BSGE programme for registrars which is aligned with the RCOG matrix (more details later)
- Reciprocal membership of ESGE and AAGL

World Endometriosis Society (WES)

<https://endometriosis.ca>

European Society of Human Reproduction and Embryology (ESHRE)

<https://www.eshre.eu/Membership>

Cost is 30Euros/year for trainees. Benefits:

- Access to webinars

Society of Endometriosis and Uterine Disorders (SEUD)

<https://seud.org/becoming-a-member/>

Lifetime membership of SEUD is free once you've attended one of their annual congresses

f. Courses to Consider

Clearly the Covid pandemic will have an impact on face-to-face teaching that is available but some of these courses may be delivered virtually or in-person later in the year.

RCOG:

<https://www.rcog.org.uk/en/courses-exams-events/store/>

Basic practical skills in O&G – includes an introduction to laparoscopy for ST1-2

Benign abdominal surgery course - usually includes an extra practical day as an optional add on. Aimed at ST5-7. Expensive but excellent. Mandatory for some gynae ATSMs. For some ATSMs if you do it before you are registered for the ATSM it won't count so check with your local preceptors.

Dundee Institute for Healthcare Simulation:

<https://dihs.dundee.ac.uk/courses/gynaecology-courses>

Includes essential (ST1-2) and intermediate (ST 3-5) lap skills courses, as well as laparoscopic suturing (ST1-7), and TLH courses (ST6-7). The latter is a cadaveric course and fantastic for fully appreciating and exploring side wall anatomy but expensive.

Scottish Centre for Simulation & Clinical Human Factors, Larbert:

<https://scschf.org/product/simulated-laparoscopic-skills-training-in-obstetrics-and-gynaecology/> for ST1-2. Get a trainer loaned afterwards for ongoing practice.

The Academy Leuven, Belgium:

<https://europeanacademy.org/> Numerous excellent courses and (hopefully once international travel recommences) easy to get to with modestly priced accommodation nearby.

Pre congress courses: BSGE, ESGE, EEL and SEUD all run pre-congress skills courses

These are usually heavily subsidised and open to non-members (and for some you don't need to attend that actual conference.)

Psychomotor Exercises for Simulators

a. Top Tips:

When to use it:

- Post extended leave – e.g. after OOP/Maternity Leave
- Surgical warm-up – to get back to “where you left off”
- Try new pieces of kit
- Try different port positions

To get the most out of your session:

- Use a stopwatch
- Have a target for exercise completion
- Working alongside a colleague on their box can increase enjoyment

b. Build your own trainer

Whilst the deanery has purchased several box trainers, there will not be enough for every trainee to have permanent access to one. It is however possible to build your own! There are plenty of videos on YouTube to give you ideas on how to construct your trainer

Equipment required:

- A box with one end removed – plastic or cardboard
 - You will need to make some holes in the top of your box to act as the “ports”
- Phone holder e.g. ISBERGET (Ikea)
- Light source (cheap torch) if your box isn't clear
- Phone or Tablet with working camera
- Peg board or similar for the base
- Laparoscopic instruments – can often get disposable ones quite cheaply on eBay

c. Basic Skills and Suggested Exercises

The following exercises are designed to improve your hand-eye coordination and familiarity with the instruments

Task 1: Instrument Navigation

Place a map of the London Underground in the field of view

Using your dominant hand, touch each station along a route

Go back in the opposite direction

Repeat with your non-dominant hand and different routes



Task 2: Moving Beads

Place a small container with beads in the field of view

Place a small empty saucer or container lid a few cm away

Using your dominant hand and a grasper move the beads from the container to the saucer

Repeat in the opposite direction

Repeat with your non-dominant hand



Task 3: Stacking Sugar Cubes

Place a few sugar cubes in the field of view

Using your dominant hand, and a grasper, stack as many sugar cubes as you can to build a tower

Repeat with your non-dominant hand



Task 4: Bagging Beads

Place a laparoscopic sample retrieval bag in the field of view

Place several small beads close to the bag

Use a grasper in one hand to stabilise the bag.

With the other hand, use a grasper to pick up each bead and place it into the bag, try and put the beads as far into the bag as possible.

Repeat the exercise with your other hand stabilising the bag.



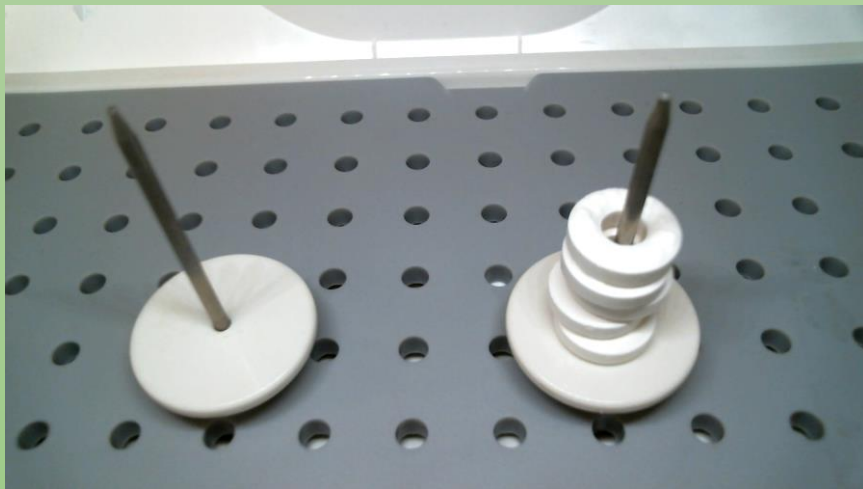
Task 5: Placing Polos onto a Post

Place a post in the peg board along with a few polo mints

Using your dominant hand and a dissector or grasper, pick each polo mint individually and place it onto the post

Repeat the task with your non-dominant hand

Vary where the post is on the peg board



Task 6: Threading loops

Place the threading board in the field of vision

With your dominant hand and a grasper, pick up the string and thread it through the first loop. You will need to push the string through from one side and pull it through the other side.

Continue to thread through all the loops

Repeat the exercise in different directions



d. Intermediate Skills and Suggested Exercises

The following exercises will improve your coordination, precision cutting, working in a tissue plane and working with traction and counter-traction.

Task 1: Transferring Polo Mints

Place 2 posts in the peg board a few spaces apart along with some polo mints

Using a grasper place the polo mints onto the left hand post

Using your left hand pick up a polo mint from the post, pass it to your right hand and place it on the right hand post.

Once you have transferred the polo mints, repeat the process in the opposite direction



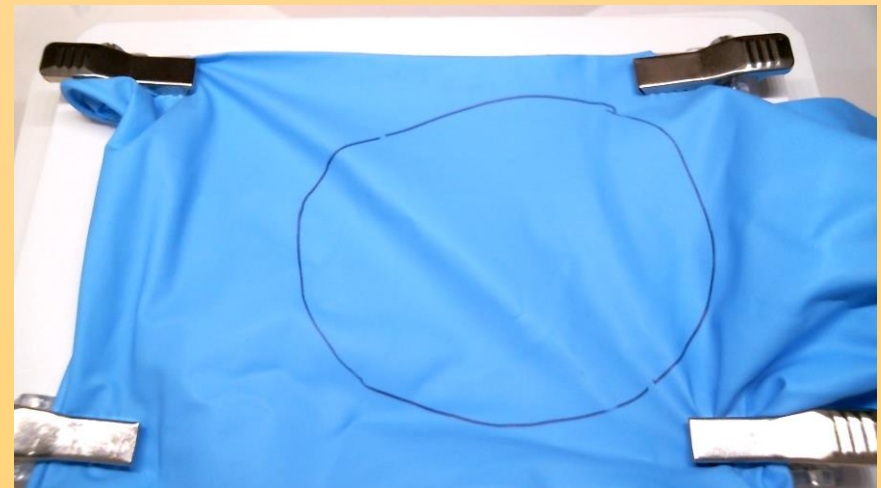
Task 2: Precision Cutting

Draw a circle onto a disposable glove and secure it onto the peg board with clamps

Stabilise the glove with a grasper in one hand

Using scissors, carefully cut out the circle

Repeat the exercise with your other hand and with different shapes on the glove



Task 3: Place Beads onto toothpick

Place some small beads into the field of view along with some toothpicks placed at various angles (e.g. stuck into some blutack)

Using Marylands and your dominant hand, stack the beads onto the toothpicks

Repeat the procedure with your non-dominant hand

Set yourself a time target e.g. how many can you transfer in 1 minute?



Task 4: Peel and Segment a Satsuma

Place a post onto the peg board and spear a satsuma on it

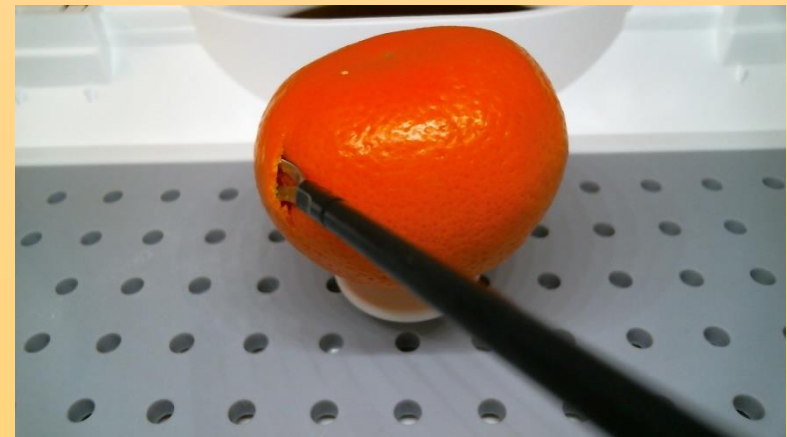
Make a small incision with a knife

Develop the tissue plane using scissors and marylands

Try not to pierce the segments as you're removing the peel

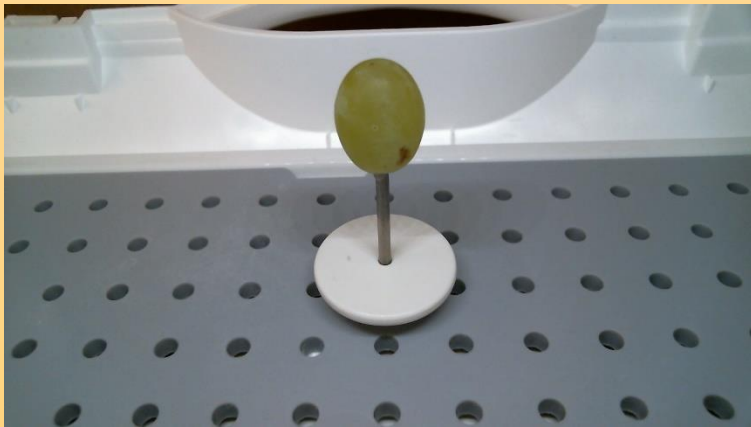
Once fully peeled, split the segments up

You could also peel the individual segments



Task 5: Peel a grape

Place a post onto the peg board and spear a grape on it
Using scissors and a dissector, incise and peel the skin from the grape
Try to keep the skin in one piece as much as possible
You could also use a Brussel Sprout and peel the leaves one at a time



Task 6: Unwrap a Sweet

Place an individually wrapped sweet into the field of vision
Using graspers, grasp opposite ends of the wrapper
Pull in opposite directions until the sweet unwraps



Task 7: Untwist a Liquorice Stick

Cut a liquorice Twizzler to approx. 8cm and place one end in a bulldog clamp

Using graspers, remove one section at a time



Task 8: Salpingotomy and Salpingectomy

Stuff a long balloon with a small piece of cotton wool to create your "fallopian tube and ectopic"

Stick to a piece of duct tape and then fold over to create your "mesosalpinx" as shown

Use scissors to incise the tube over the ectopic and remove the cotton wool (i.e. perform a salpingotomy)

Use scissors to remove the tube (i.e. perform a salpingectomy)



e. Advanced Skills and Suggested Exercises

These exercises are designed to improve your skills for intracorporeal suturing

Task 1: Loading the Needle

Watch this video <https://youtu.be/4bbINGoizkQ>

Practise the 2 techniques for loading a needle

Tissue Pick Up Method

- Lay the needle on the soft tissue
- Open the jaws of the needle holder around needle at the point you wish to load it
- Press gently into the tissue and close the jaws

Pirouette Technique

- Grasp the thread with your non-dominant hand
- Gently stabilise the tip of the needle against the tissue
- Grasp the needle where you wish to load it with the needle holder



Task 2: Suturing a sponge

Watch this video <https://youtu.be/4bbINGoizkQ>

Place a sponge in the trainer box and secure it with clamps

Load the needle

Take a bite of the sponge with the needle. You can then move onto task 3 and tie a knot or you can perform a running stitch on the sponge.

Try varying the depth of the suture by altering the angle of your needle at the point of insertion into the sponge



Task 3: Knot Tying

3.1 Square Knot

Watch this video <https://youtu.be/F2e8IMISess>

Practise tying a square knot

3.2 Slip Knot

Watch this video <https://youtu.be/luyju1pNRsg>

Practise tying a slip knot



Task 4: Backhand Stitch

Watch this video on how to manipulate the needle to perform a backhand stitch

<https://youtu.be/drAnJfZxU8w>

Practise performing a back hand stitch



Task 5: Ovarian Cystectomy

Stuff a balloon with cotton wool or gauze and then insert into another balloon to create your ovary containing a cyst

Secure the balloon to the base with clips or tape

Use scissors to perform cystectomy without cutting into the cyst wall (the internal balloon)



Once the cyst is removed, suture the ovary (outer balloon)

