Introduction

Inguinal hernia repairs are easy aren’t they? Ermm... no, not really. Or at least not to begin with. The learning curve for an inguinal hernia is actually quite steep, probably because they can look so different every time you open the inguinal canal—it can be very frustrating. We’ve all been there. It never looks as clear as it does in the textbooks or atlases; it’s almost as if the people who wrote those books had never seen one in real life. Like the appendicectomy, the inguinal hernia repair can be really quite difficult for the beginner, yet these two operations are still left to the most junior surgeons, often without supervision.

Nevertheless, take heart that everyone struggles to begin with and that once you’ve seen and done a few it will become second nature. Showing an inguinal hernia on video is actually rather tricky as the wound is quite small and the anatomy quite complex. Like many of the videos, you’ll probably need to play it through a few times to take everything in. Here we show one whole operation all the way through and then in the Inguinal Hernia Extras video, a female inguinal hernia repair, an inguinoscrotal hernia and another indirect hernia so as to go over separating the cord and separating the sac—the bits everyone gets stuck on. Once you can do this, you’ve cracked it.

We are of course showing the Lichtenstein mesh repair—the most commonly used technique in the UK.

Procedure

With the patient supine and under general or local anaesthesia, shave, prep and drape the groin. Note the bony landmarks of the anterior superior iliac spine (ASIS) and the pubic tubercle. The inguinal ligament runs between these two. Your incision therefore needs to be a fingerbreadth or two above and parallel to the medial half to two-thirds of this. Incise through skin, Camper’s fascia and Scarpa’s fascia (which is white and membranous) then through fat. It’s likely
you’ll encounter a chunky vein running vertically in your wound—ligate and divide it if it’s substantial enough, otherwise use diathermy. Keep incising down to external oblique maintaining haemostasis as you go. If the abdominal wall is quite thick, inserting a Travers retractor at this stage can be quite helpful.

You’ll recognise the aponeurosis of external oblique by the fibrous strands running parallel to your wound. Once you’ve reached it, you need to decide the level at which you’re going to open it. Trace the fibres down towards the pubic tubercle and look for where they decussate. That’s what the external ring is, a triangular gap where the upper fibres plunge inferiorly to the lateral tip of the pubic tubercle and the lower fibres criss-cross over and leap over to attach more medially. You can actually see this decussation and it marks the apex of the external ring where the hernia may be popping out.

So, make a stab incision in the line of the fibres at the level of the apex of the external ring. Take a small clip and clasp the upper leaf and the same with the lower leaf. Using closed dissecting scissors bluntly create a plane below the external oblique in the line of the canal, thus separating off the cord or the ilioinguinal nerve, which may be sticking to it just below the surface. Score with the scissors inferomedially down to the external ring and the same superolaterally. With upward traction on the external oblique clips gently dissect beneath external oblique, superiorly and then inferiorly, thus creating a plane beneath it. Insert the Travers’ retractors into this plane. Congratulations, you have now opened the inguinal canal. But, I’m sorry, you haven’t fixed the patient yet; now comes the hard part. You look into the canal and unless you’re very lucky, you just see a big bulging muscley, fatty, tissuey lump. What you’re looking at is two things: the cord and the sac and they may be intimately entwined.

The first thing to do is separate the cord (+/- sac) from the pubic tubercle. Begin by gently snipping, with the tips of...
your scissors, any loose connective tissue that you can obviously see tethering the cord (+/− sac) down to the posterior wall of the inguinal canal. Next you need to hook the cord (+/− sac—that’s getting boring, assume we mean potentially both for now) up with your finger. Insert your index finger into the inguinal canal with fingernail lying against the inside of the inguinal ligament with fingertip pointing to the pubic tubercle. Push your finger under the cord keeping your fingernail apposed to the pubic bone (there should be almost nothing between your fingernail and the bone—all the vessels etc. arching over the tubercle are staying with the cord—you don’t want to leave them behind). Hook up the cord with your finger and gently probe with the fingertip until you see it emerge on the medial side of the cord. There is a knack to it and it comes with practise. It helps if you keep the axis of your finger horizontal, that is in line with the superior edge of the pubic bone, rather than pointing it upwards as you may just be pushing straight into a direct hernia.

Once the cord is suspended over your hooked finger you need to work out what’s cord and what’s sac. To do this you first need to decide—is it an indirect hernia or a direct hernia? In an indirect hernia, the whole cord is bulky but it has a relatively narrow base (well, the same width as the rest of the cord) emerging from the deep ring and you can easily peel it off the posterior wall, which isn’t bulging out. In a direct hernia however you will either feel a thin cord and behind it the posterior wall is bulging out, or, more likely, the whole cord seems to be coming from a very wide base stretching out over the whole of the back wall. This is because the sac emerging from the posterior wall has fused with the cord structures running past it. If this is the case, hook the cord inferoanteriorly and you’ll see the posterior wall tethered up to the back of it. Dissect the connecting strands with scissors all the way back to the deep ring and the direct hernia bulge will fall back into its rightful place on the posterior wall and the cord will thin out. You may of course find both.

So, for the indirect hernia, the first part of this game is to find the white edge of the peritoneal sac. Everyone has their own favourite method of doing this. Here we show dissecting scissors gently peeling off the outer layers of the cord, all those cremasteric fibres, by firmly stroking the closed tips in the direction of the cord. Some people like to pinch the cord between finger and swab to firmly wipe off the outer layers and systematically
go from one edge transversely across to the other, thinning out the cord as they go. However you do it, you’re looking for a white edge somewhere within the cord.

Once you see it, get a clip on it, get two if you can. Lift them up and gently dissect all the adjacent tissue away from the white edge, keeping close to the white edge, until the white edge gets bigger and bigger and more and more separate from the rest of the cord. If you’re not sure where it’s going, for example if you think it’s going all the way down into the scrotum, you can open it and put your finger inside. Get the whole sac dissected out down to the level of the deep ring.

**Twist the sac** several times thus pushing any contents back into the abdomen and transfix it at the base with an absorbable suture such as 2–0 Vicryl. Cut the stalk of the sac first, not the stitch, that way you can check it’s not bleeding before it dives back into the abdomen. If the deep ring has been widened by this intruder a simple stitch or two, medially and/or laterally to the ring will help.

Now, what if you find a direct hernia? This is much easier; you could just go straight to the mesh step but it’s usually
easier to push the hernia back in with your finger, thus invaginating it, and then **plicate the posterior wall**. This stitch doesn’t have much strength but it does make it easier to get the mesh down flat on the posterior wall. **Poke the hernia** back in with your index finger, this creates a **little ridge** of tissue (made of a bit of transversus abdominus and transversalis fascia) just above and below the tip of your finger in the medial part of the posterior wall—take a bite of the bottom ridge and then the top ridge and tie a knot (obviously taking care not to include your finger in the stitch). Keep stitching the bottom ridge to the top ridge until the hernia is essentially **inverted** and the back wall looks flat. Don’t be overly ambitious with those stitches, trying for example to stitch strong muscle all the way down to inguinal ligament—this is unnecessary and just creates tension which is not what you want for wounds to heal. Also don’t place the stitches too deep; don’t forget that the **inferior epigastric vessels** aren’t far behind.

Now for the **mesh**. **Shape** it roughly before inserting it. The corner that will lie over the pubic tubercle can be rounded off. **Create a slit** so that you can wrap it round the cord—and at the apex of the slit create a **V-shape** so that the cord can fit through.

**Stitch** or **staple** the rounded corner to the tissue lying just over the **pubic tubercle**. It’s very important that the mesh **overlaps the pubic tubercle**, and superiorly extends well beyond it, ideally to the **midline**—this is where the
hernia will recur if you don’t. Hold the lower part of the mesh down so its lower edge is right over the inside of the inguinal ligament. Run a continuous non-absorbable suture such as 2–0 Prolene, suturing the two together; alternatively use staples. When you get to the deep ring, suture or staple the upper leaf to the lower leaf just lateral to the deep ring thus re-creating a new deep ring. Stitch the upper leaf down to the inguinal ligament. Not much else needs to be done laterally. Medially, you need to stitch the edge of the mesh down to the posterior wall, or staple it. Stretch the mesh out over the posterior wall so that it isn’t heaped up or too tight and continue the suture or staples around the medial edge onto the superior edge. Take care to avoid including a nerve in your suture or staple.

If you’ve got this far and it’s your first hernia—very well done to you. Now close up. Re-apply clips to the upper and lower edges of external oblique and run a continuous absorbable suture such as 2–0 Vicryl from lateral to medial or medial to lateral, thus re-constructing the external ring. The fascia and fat can be closed with continuous absorbable suture and the skin with an absorbable subcuticular suture.

**Notes**

You’ll see in the video that on finding an indirect hernia we don’t do the usual twisting of the sac, transfixing and amputating it (which you can see in the Inguinal Hernias Extras video). This is because it’s a sliding hernia as evidenced by the fat (and sometimes retroperitoneal structures like caecum) you can see in its wall. This is essentially a prolapse of the retroperitoneal tissues through the deep ring, rather than a processus vaginalis. If in doubt open the sac, if the lining has attached caecum inside, for instance, obviously you don’t want to chop that off, so simply reduce it back to the abdomen.

In **women** (see Inguinal Hernia Extras video), inguinal hernia repairs are considerably easier. They have only rudimentary structures, principally the round ligament, passing through their inguinal canal—and this can be simply ligated and divided. The hernia can then be invaginated back into the abdominal cavity and the posterior wall plicated as for a direct inguinal hernia. You can then apply a piece of mesh without the usual slit to accommodate the cord, directly on to the posterior wall and stitch or staple it in.

In inguinoscrotal hernias (see Inguinal Hernia Extras video), the sac passes right

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**Completed mesh**—note the inferior row of staples have been inserted onto the inside of the inguinal ligament.
through the canal into the scrotum where it’s usually firmly adherent. **Don’t try and dissect** the sac out of the scrotum—this will just result in lots of bleeding and is unnecessary. Instead, dissect out the sac in the usual way from the cord and **transect** it, leaving the distal part in the scrotum, undissected and **leave it open**. Any fluid that builds up in the residual sac will drain out of the hole, so don’t close it or otherwise you’re effectively giving the patient a hydrocoele. Deal with the proximal side in the same way as you would for any indirect hernia.

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**Summary**
- The patient is **supine** and under **general** or **local anaesthetic**
- The correct groin is **shaved, prepped** and **draped**
- **Incise skin** above the medial half of the inguinal ligament
- Incise down to **external oblique**
- **Open** external oblique at the level of the external ring
- **Create a plane** beneath external oblique
- **Separate cord +/- sac** from the **pubic tubercle**
- Separate **cord from sac**
- **Transfix** and **amputate** indirect sacs
- **Plicate posterior wall** if bulging
- **Shape** and **insert** a mesh securing it, most importantly, medially
- **Close** the external oblique
- **Close** fascia then skin