

# Common Techniques in Elective Groin Hernia Repair: A Guide for the Trainee

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**Abstract:** Inguinal hernia repair is a cornerstone of general surgery, with multiple techniques available to address this common condition's anatomical and physiological challenges. This paper provides a comprehensive step-by-step guide on the technical execution of the most common techniques required for the elective setting endorsed by the Danish Hernia Database: the Marcy repair, the standard and modified open Lichtenstein repairs, and the laparoscopic transabdominal preperitoneal (TAPP) repair, aimed at enhancing the skill set of surgeons in training in Denmark. Each technique is described in detail, highlighting the procedural steps. This guide seeks to equip surgical trainees with a detailed understanding of each technique, fostering a practical knowledge base for making informed choices in clinical practice for the elective setting.

**Keywords:** inguinal hernia; training; elective surgery; Marcy repair; Lichtenstein repair; laparoscopic repair; TAPP.

## 1. INTRODUCTION

Inguinal hernias represent one of the most common disorders managed by general surgeons, characterized by the protrusion of abdominal contents through a weakness in the lower abdominal wall. The condition predominantly affects males and can significantly impact the quality of life due to discomfort and potential complications such as becoming an acute irreducible hernia or strangulation of hernia content. Effective surgical repair is not only curative but essential for preventing complications associated with hernias.

The surgical management of inguinal hernias has evolved significantly over the years, with a shift towards methods that promote rapid recovery, minimize pain, and reduce recurrence. The open Lichtenstein repair and the laparoscopic approaches are the most commonly employed techniques, but to be a functional elective surgeon in inguinal hernias it is also necessary to master the Marcy repair and the modified Lichtenstein repair. Each technique has distinct advantages and particular indications based on patient factors and surgeon expertise. As the TEP technique has recently been described in detail [1], it will not be covered in the present paper.

This paper aims to provide a guide delineating Denmark's most commonly used surgical methods for elective inguinal hernia repair. The focus will be on technical nuances, step-by-step procedural insights, and practical tips to enhance the learning curve for surgeons in training. By comparing these approaches, this guide will assist young surgeons in understanding the critical aspects of each technique, enabling informed decision-making in clinical practice. Through a detailed exposition of these procedures, the paper seeks to contribute to the ongoing education of surgical trainees, ensuring they are well-prepared to handle the complexities of inguinal hernia repair in the elective setting.

### 1.1. Available Repair Methods

Numerous repair methods are available, but for daily clinical practice, it is recommended to become confident with the most common open repair techniques and one of the laparoscopic methods.

For open repair, the standard methods in most countries seem to be annulorrhaphy (Marcy repair) [2] for lateral hernias and the Lichtenstein repair [3] for both lateral and medial hernias. Open repair for a femoral hernia can be done safely with a modified Lichtenstein technique (see below). Numerous other repair techniques exist but as they are not commonly

used in Denmark they are not described in detail in the present paper.

For a minimally invasive approach, the transabdominal pre-peritoneal repair (TAPP) [4] and the totally extra-peritoneal repair (TEP) [5] are widely used worldwide but in Denmark only the TAPP technique is used routinely. Recently the robotic approach has in some institutions gained popularity. The choice between TAPP or TEP or robotic approach is based on local traditions and surgeon preferences rather than differences in outcome, since the available outcome data suggest that complication rates and recurrence rates are comparable between TAPP and TEP [6], and the robotic approach can be seen as just another way of performing a TAPP repair.

The other repair methods mentioned in Table 1, the Bassini repair [7], McVay repair [8], Shouldice repair [9], and various open

preperitoneal techniques [10] all have their own indications. The Bassini and McVay repairs are open non-mesh techniques and were used widely before the introduction of mesh repair by Lichtenstein in 1986 (Table 1). Today, the Bassini repair and the McVay repair are used in acute cases with a dirty field, where a mesh should be avoided. The Shouldice repair [9] has excellent results in experienced hands with very low recurrence rates, but it has not gained wide acceptance in daily clinical practice outside dedicated centers. The open preperitoneal techniques [10] use an anterior approach and after perforating the abdominal wall the mesh is placed in the preperitoneal space. The recently developed ONSTEP method [11] combines the preperitoneal mesh placement medially with placing part of the mesh laterally and anteriorly to the muscle plate surrounding the spermatic cord at the profund annulus.

**Table 1.** Historical highlights of key advances in inguinal hernia repair for the most commonly used procedures.

Operation technique	Author first described	Year	References
Non-mesh techniques (tissue repair)			
Marcy repair (annuloraphy)	Henry O. Marcy	1871	2
Bassini repair	Edoardo Bassini	1887	7
McVay repair	Chester B. McVay	1941	8
Shouldice repair	Earle Byrnes Shouldice	1953	9
Mesh-based techniques			
Lichtenstein repair	Irving L. Lichtenstein	1986	3
TAPP laparoscopic repair	Maurice E. Arregui	1992	4
TEP laparoscopic repair	Jean-Louis Dulucq	1992	5
Preperitoneal open techniques (various)			10
Onstep method	Augusto Lourenço & Rui Soares da Costa	2013	9

### 1.2. Mesh Versus Non-Mesh and Choice of Technique

Choosing the appropriate technique depends on multiple patient-specific factors, including age, comorbidity, previous abdominal surgeries, and

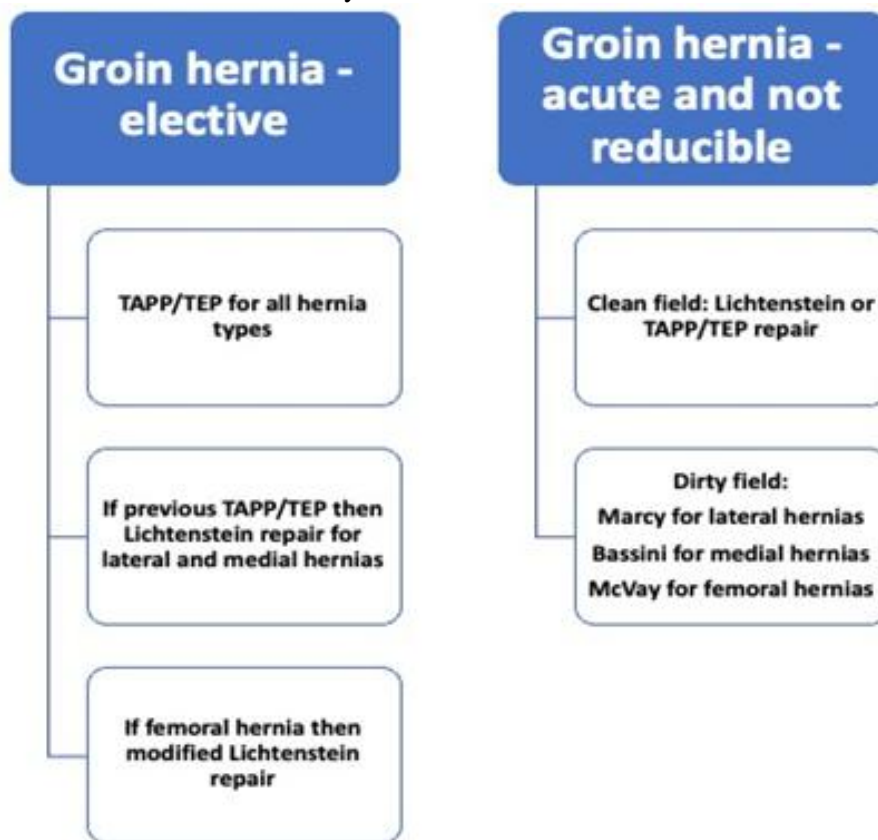
the bilateral or recurrent nature of the hernia. Personalized treatment planning is essential, and surgeons must therefore be versatile in both open and laparoscopic techniques to adapt to individual patient needs.

**Table 2:** Routine surgical methods for groin hernia repair in adults. Numerous surgical methods have been described and are used around the world, but the most common methods are given in the table. The open non-mesh methods were developed for various hernia types, but today, with the availability of the full armamentarium of surgical options, these open non-mesh techniques are usually used for special indications. TAPP (transabdominal preperitoneal) and TEP (totally extraperitoneal) are laparoscopic, and the others are open techniques. Babies and small children are operated by open technique with high ligation of the hernia sac and without the use of a mesh. In adolescents, this is supplied with a narrowing of the profund annulus, the so-called Marcy repair.

	Hernia type	Surgical methods
Mesh	Lateral	TAPP, TEP, Lichtenstein
	Medial	TAPP, TEP, Lichtenstein
	Femoral	TAPP, TEP, modified Lichtenstein
Non-mesh	Lateral	Marcy
	Medial	Bassini, Shouldice
	Femoral	McVay

Most groin hernias in adults are repaired with a mesh-based technique (Table 2). Non-mesh repair is in most clinics almost exclusively used

for acute cases with a dirty field [12] (Figure 1), and in children and adolescents [13].



**Figure 1.** Surgical management of groin hernias in adults. TAPP: transabdominal preperitoneal. TEP: totally extraperitoneal.

The choice between open or laparoscopic technique is simple when following the current guideline [14], because laparoscopic repair is recommended as the first choice in primary and recurrent hernias if local expertise is available. Furthermore, a laparoscopic approach is recommended for recurrent hernia if the primary hernia was repaired by an open technique, and an open technique for a recurrent hernia is recommended if the primary repair was performed by a laparoscopic approach (Figure 1).

### 1.3. Anesthesiological Considerations

Anesthesia is a key factor in getting better surgical conditions during the procedure, but the anesthesiologist may not always know exactly what the problem is for the surgeon. Therefore, a qualified dialogue between the two specialties with better communication is important to ensure the best possible patient outcome [15].

As pioneered by Irving Lichtenstein 60 years ago [16], all open groin hernia repairs can be performed safely in local infiltration anesthesia if the patient is prepared before the procedure. The operative technique is, however, slightly

different because the dissection technique has to be atraumatic using sharp dissection and as little electrocautery as possible.

Commonly used local anesthetics include lidocaine (0.5%-1%) or bupivacaine (0.25%-0.5%). Bupivacaine has a longer duration of action and will therefore provide longer-lasting pain relief after the procedure. Prepare 20-40 mL of the chosen anesthetic solution, ensuring the total dose does not exceed the maximum safety limit. Start by injecting a small bleb of local anesthetic intradermally at the site of the planned incision. Slowly advance the needle through the skin while continuously infiltrating the anesthetic. This creates a linear track of anesthesia along the planned incision line.

After the skin is anesthetized, you can start the surgical procedure and infiltrate again when you reach the external oblique aponeurosis. Infiltrate the local anesthetic below the aponeurosis and around the inguinal canal. This involves injecting in a fan-like pattern around the superficial inguinal ring and along the inguinal ligament. Open the aponeurosis and infiltrate the

anesthetic around the ilioinguinal nerve under direct vision and into the deeper tissues, including the internal oblique and transversus abdominis muscles. Carefully infiltrate around the pubic tubercle.

Inject the anesthetic in small increments several times during the operation when advancing to new anatomic areas of dissection and whenever the patient feels pain intraoperatively. By following these steps, local anesthesia can be effectively administered to provide adequate pain control during groin hernia repair, ensuring patient comfort and facilitating a smooth surgical procedure.

Even though it is simple after a short learning curve, and it will provide pain relief for several hours after the operation, use of local infiltration anesthesia for groin hernia repair has not gained wide acceptance. There are many reasons for this including intraoperative pain, quality of surgical technique, communication, teaching, logistics, and clinical routines [17]. Thus, general anesthesia is a typical choice for groin hernia repair, and this has been shown to have the same low risk of urinary retention than local infiltration anesthesia, but the highest risk was seen with epidural or spinal anesthesia [18]. Therefore, regional anesthesia should be avoided, and local infiltration anesthesia can be used according to local routines or if there are rare contraindications against general anesthesia.

Laparoscopic groin hernia repair is performed under general anesthesia, and adequate exposure of the operative field is ensured by a satisfactory level of anesthesia. In some cases, but not all, relaxation is necessary to facilitate the surgical procedure and deep relaxation may even permit the use of low-pressure pneumoperitoneum reducing postoperative pain and the need for analgesics [19].

## 2. CONSIDERATIONS FOR CHOICE OF SURGICAL TECHNIQUE BASED ON PATIENT FACTORS

All patients undergoing groin hernia repair are assessed through a preoperative evaluation that includes a thorough medical history, physical examination, and in rare cases also imaging studies to establish the diagnosis and plan the surgical approach.

### 2.1. Medial Versus Lateral Hernia

It may be difficult preoperatively to determine if the patient has a lateral or a medial hernia, but fortunately, in the adult patient, the repair

technique is almost similar in the open anterior approach. In most patients, the method of choice would be the Lichtenstein technique and the only difference between the repair of the lateral and the medial hernia defect is the narrowing of the defect with sutures before placing the mesh. The reason for narrowing the defect is that it technically makes it easier for mesh placement without a bulge being in the way. Thus, before placing the mesh, the lateral defect will be narrowed like in the Marcy repair with interrupted sutures, and the medial defect will be closed with sutures like in the Bassini repair. Before Irving Lichtenstein published his paper on the mesh-based technique [3], the Marcy repair [2] and the Bassini repair [7] were used extensively for lateral and medial hernias, respectively. This is supplemented by a mesh placement, lowering the recurrence rates. Until recently, the preoperative diagnosis of a medial versus a lateral hernia has not been important, but new development may change that. Thus, new data suggest that an indirect hernia in a young male may be repaired with sufficient results without the use of a mesh [20], and preoperative diagnosis of a lateral versus a medial hernia may therefore in the future be relevant, because these young males with an indirect hernia could have an open repair without a mesh (Marcy repair) and if it is determined preoperatively that the hernia is a medial inguinal hernia then a laparoscopic approach would be appropriate.

### 2.2. Inguinal Versus Femoral Hernia

It can be difficult to distinguish between an inguinal and a femoral hernia preoperatively so sometimes in an open approach there will be no medial or lateral hernia, but rather a femoral hernia defect that needs to be repaired.

In the open anterior approach, there are primarily two options to repair a femoral hernia when the inguinal canal has been opened. That will be the McVay technique as a non-mesh repair or the modified Lichtenstein technique as a mesh-based repair. It is technically easier to perform the modified Lichtenstein technique because there is no tension on the tissue with this approach.

Thus, when performing open groin hernia repair you have to be able to master the modified Lichtenstein technique to finish the operation if a femoral hernia is encountered.

### 2.3. Emergency repair

In the acute situation with a possible strangulated hernia with bowel ischemia, it is



important to master also the open non-mesh techniques such as the Marcy, Bassini, and McVay repairs. The reason for this is that if the surgical field is dirty with bowel perforation, then most surgeons would recommend using a non-mesh-based technique.

#### 2.4. Considerations for Laparoscopic Repair

In laparoscopic repair, there are no such considerations for choice of technique since all the hernia orifices are covered with the mesh during the operation. Thus, a lateral, medial, and femoral defect will all be covered by the same 10 x 15 cm mesh. If the rare obturator hernia is encountered, then it is simple to choose a slightly larger mesh that will also cover this area below the pubic bone.

The only consideration in the laparoscopic approach would be if there is an accidental bowel perforation with contamination of the surgical field and then it would probably be wise to take care of the bowel perforation but stop the hernia operation and come back at a later stage when the infection is gone.

### 3. TECHNICAL HIGHLIGHTS OF THE MOST COMMONLY USED TECHNIQUES FOR INGUINAL HERNIA REPAIR

As inguinal hernia surgery uses several different techniques, it is advised for the trainee to start with the techniques that are used most often in daily practice. That would in most parts of the world be the Marcy repair, Lichtenstein and modified Lichtenstein repair, and one of the laparoscopic techniques. Since TEP repair has recently been described in detail [1], the present paper will cover only TAPP repair for a laparoscopic technique. The Bassini, Shouldice, McVay, and the various open preperitoneal repairs are used in rare indications in most departments and will therefore also not be covered in the present paper.

#### 3.1. Marcy Repair

**Indication:** *Lateral hernias.*

Equipment and materials: Standard surgical set for open hernia repair, sutures, and local anesthetic.

##### Step 1

An incision is made over the inguinal canal, ensuring adequate exposure of the surgical site. In small patients the incision can be 4-6 cm and slightly longer in large patients. The position of the incision should be in a line from 1 cm cranial to the pubic tubercle pointing at the

anterior superior iliac spine but of course not all the way between these two landmarks.

The incision is deepened through the subcutaneous tissue and Scarpa's fascia. Careful dissection is continued until the external oblique aponeurosis is exposed. The external oblique aponeurosis is then opened from the cranial margin of the superficial annulus in the fiber direction towards the anterior superior iliac spine, providing access to the underlying structures.

Right under the aponeurosis the ilioinguinal nerve is very often encountered, and this would be a good moment to apply a local anesthetic to the nerve as high laterally as possible thus providing an ilioinguinal block under direct visual guidance.

##### Step 2

The next step is to identify the hernia sac within the inguinal canal. If it is not immediately visible it is a good trick to look for it anteromedially in the spermatic cord. Thus, you grab the entire cord between your thumb and index finger and turn it around from caudal to cranial. Then the anteromedial part of the cord is visualized and you will most often see the sac here.

The sac is carefully dissected free from surrounding tissues. Depending on the specific circumstances, the hernia sac is either reduced back into the abdominal cavity or ligated and excised.

At this point, you can apply local anesthetic to the edges of the profundus annulus and to the cord itself but be very careful not to perforate any of the vessels.

##### Step 3

The hernia defect is typically a widened profundus annulus. The defect is tightened using 1-3 sutures, tailored to the size of the defect. Be careful not to tighten it too much. This step is crucial for ensuring a robust repair and preventing recurrence.

There seems not to be a consensus if the sutures should be absorbable or non-absorbable, so you can follow local routines regarding the choice of suture material.

##### Step 4

The external oblique aponeurosis is sutured over the spermatic cord, restoring the normal anatomical structure of the inguinal region. This

can be done with absorbable running suture. If the subcutaneous tissue is deep then it can be a good idea to suture also the Scarpa's fascia to restore normal anatomy but in most patients, it is not necessary.

Before skin closure you can apply local anesthetic to the wound edges. The skin is closed with absorbable sutures, non-absorbable sutures or skin staples according to local routines.

### 3.2. Open Lichtenstein repair

**Indication:** Lateral and medial inguinal hernias.

Equipment and materials: Standard surgical set for open hernia repair, polypropylene mesh, sutures, local anesthetic.

#### Step 1

A 6-8 cm incision is made over the inguinal canal, parallel to the inguinal ligament, to provide adequate exposure to the surgical site. The incision is placed like in the Marcy repair but slightly longer to facilitate proper dissection for mesh placement.

Dissection through the layers as well as applying local anesthetic to the ilioinguinal nerve is the same as in the Marcy repair.

#### Step 2

The hernia sac is identified as in the Marcy repair. The lateral sac can be reduced back into the abdominal cavity or ligated and excised, depending on the size of the hernia. The medial sac is reduced back to the abdominal cavity.

In either hernia type, the defect is approximated with sutures to facilitate mesh placement. There is no consensus on the choice of suture material so you may follow local routines.

#### Step 3

A polypropylene mesh is prepared and tailored to the appropriate size. The mesh is placed over the posterior wall of the inguinal canal, under the spermatic cord and laterally surrounding the cord at the profundus annulus. It is fixed with non-absorbable sutures to the pubic tubercle, and with a running suture from this point along the profundus edge of the inguinal ligament and laterally extending 2-3 cm beyond the level of the profundus annulus. Cranially the mesh is fixed with 3-4 interrupted sutures to the internal oblique muscle to ensure it lies flat without tension. Be careful with these sutures not to catch branches of the iliohypogastric nerve inside the muscle tissue so it may be advised to keep these sutures rather loose.

When operating under local infiltration anesthesia it is obvious that the fixation of the mesh to the pubic tubercle usually generates pain during the procedure, so regardless of whether the patient is sleeping or awake for the procedure, it will be a good idea to inject 1-2 ml of local anesthetic at the pubic tubercle before suturing the mesh here.

#### Step 4

The external oblique aponeurosis is sutured back over the cord and the mesh with a running absorbable suture, restoring the anatomy of the inguinal canal. The skin and subcutaneous tissue are closed as in the Marcy repair.

### 3.3. Modified Lichtenstein Repair

**Indication:** Femoral hernias.

Equipment and materials: Standard surgical set for open hernia repair, polypropylene mesh, sutures, local anesthetic.

#### Step 1

The first steps of the operation making the skin incision and exposing the inguinal canal are the same as in the Lichtenstein repair. If neither a lateral nor a medial hernia is found it is time to look for a femoral hernia. For this purpose, it is necessary to perforate the back wall of the inguinal canal close to the inguinal ligament. This can be done digitally or by careful dissection with instruments. Move slowly in this region preferably with digital dissection and using a napkin to move the tissue gently to the side to expose the femoral orifice exactly medial to the external iliac vein. If there is no femoral hernia then leave the preperitoneal region and close the back wall of the inguinal canal with absorbable suture.

#### Step 2

If there is a femoral hernia below the inguinal ligament then use careful dissection to free the hernia sac from surrounding structures to place a polypropylene mesh with the modified Lichtenstein technique. The sac is typically reduced into the abdominal cavity or less commonly ligated and excised, depending on the clinical scenario.

#### Step 3

A polypropylene mesh is tailored to cover both the femoral defect as well as future potential lateral and medial inguinal defects. The mesh is secured with non-absorbable sutures to the pubic tubercle and then with a running suture

fixating the caudal edge of the mesh to Cooper's ligament going lateral until it meets the internal iliac vein. Then the mesh will go anterior lying on the iliac vein and artery, and after passing this area, it will be sutured to the posterior part of the inguinal ligament with 3 to 4 running sutures. The rest of the modified Lichtenstein operation is the same as the original Lichtenstein repair with fixation of the mesh cranially to the muscle plate with interrupted suture.

As for the other open techniques local anesthetic is applied to the ilioinguinal nerve under direct vision and to the pubic tubercle.

#### Step 4

The external oblique aponeurosis is sutured back over the cord and the mesh, restoring the normal anatomy of the inguinal region. The skin and subcutaneous tissue are closed according to local routines including local anesthetic to the wound edges before skin closure.

### 3.4. Laparoscopic Transabdominal Preperitoneal (TAPP) Repair

**Indication:** All types of groin hernias.

Equipment and materials: Standard laparoscopic set, trocars (3 required: 10 mm for the camera, 5 mm for instruments). Laparoscope, minimum 10 x 15 cm polypropylene mesh, tacker device, glue, or sutures for mesh fixation, insufflation equipment, local anesthetic.

#### Step 1

The patient is placed under general anesthesia and positioned supine with a slight Trendelenburg tilt to facilitate access to the lower abdomen. The abdomen is insufflated with CO<sub>2</sub> to create pneumoperitoneum. A 10 mm trocar is inserted supra-umbilically for the camera. Two 5 mm trocars for the working instruments are placed one on each side at the same level as the umbilicus. The laparoscope is inserted through the 10 mm port, providing visualization of the abdominal cavity.

#### Step 2

The peritoneum is incised horizontally above the hernia defect with a slight lateral curve, creating a flap to expose the preperitoneal space. Careful dissection is performed to identify and reduce the hernia sac, freeing it from the spermatic cord and surrounding structures. It is easiest to start in the medial part, i.e. medially for the funicular structures, and then dissect the lateral part, and finally dissect the area around

the structures in the middle of the field. Dissection can be performed with different instruments like graspers or scissors.

At the medial dissection, it is often possible to simply push the tissue thereby releasing the Cooper ligament with the pecten below and a few centimeters further down towards the urinary bladder. Subsequently, the lateral dissection continues, i.e. the hernia sac is not yet released. At the triangle of pain [21] located in the lateral part of the operative field sometimes it is possible to see the nerves [22] but it can be difficult if there is fatty tissue. It is not advised to dissect here to look for the nerves. In general, blunt dissection is used by pulling and pushing the tissue carefully from each other.

When the peritoneum is released medially and laterally from the hernia, one goes back and works on the hernia sac. With a medial hernia, the hernia sac is released by pulling the white structure, which represents fascia transversalis, away from the operating field, i.e. into the hernia cavity. In a lateral hernia, you should pay close attention to the ductus and testicular vessels. The easiest way is to hold the hernia sac in the middle of the field, and with the other instrument release the ductus and push it medially, and push the vessels laterally by blunt dissection without grabbing the vessels. A lateral hernia is released by working from the lateral side pushing the testicular vessels laterally and thereafter working on the medial side of the hernia sac. In this way, you work by pushing the structures away from the hernia sac, and by pulling the sac more and more intra-abdominally, until it can be completely separated from all the structures.

If there is a large lipoma in the inguinal canal, this is pulled intra-abdominally but not removed completely. You can leave it on the abdominal side of the mesh still with its blood supply. A cord lipoma will typically be present lateral to the cord in the inguinal canal and it has its own thin capsule not to confuse it with fatty tissue lying on the iliac vessels.

If the hernia sac is a fully open processus vaginalis, that is, stretching to the scrotum, you can, as with the open operation, divide the sac in the inguinal canal leaving the distal part.

The release of the hernia sac in a femoral hernia occurs by gently pulling the sac with one instrument. If it is not released easily by careful manipulation, you can cut an insertion in the inguinal ligament to give more space and

thereby be able to pull the hernia sac intra-abdominally without force. Be careful here since the iliac vein is placed lateral to the femoral hernia. The dissection is continued with further release of the peritoneum, with the bladder medially, the triangle of doom in the middle, and the triangle of pain laterally.

Again, it is important to keep close to the peritoneum in the dissection, and a large area should be prepared so that a mesh of at least 10 x 15 cm can be placed without folding.

### Step 3

The mesh should cover the entire myopectineal orifice and extend well beyond the hernia defect. Use a simple flat polypropylene mesh but other versions can also be used. The mesh is secured using a tacker device, sutures, or glue ensuring it lies flat without tension. A self-fixating mesh can also be used and then avoid other fixation methods. Tacks or sutures are not used over the triangle of doom or triangle of pain, but if the mesh is secured with glue, then it is OK to apply glue in these areas.

The peritoneal flap is repositioned to cover the mesh, and the edges are sutured, tacked or glued to restore the peritoneal integrity.

### Step 4

The pneumoperitoneum is released, and the ports are removed. The fascia at the umbilical port is closed with slowly absorbable or non-absorbable suture, and skin incisions are closed according to local routines.

## 4. DISCUSSION

This paper has outlined the technical steps involved in the most commonly used techniques for groin hernia repair for the trainee surgeon in Denmark: the Marcy repair, the open standard and modified Lichtenstein repair, and the laparoscopic TAPP repair. Each technique has its unique indications, advantages, and challenges, which are crucial for surgical trainees to understand. When advancing in hernia surgery, other techniques can be learned if needed. The minimal technical requirements as a hernia surgeon include a laparoscopic approach and a few open techniques. The present paper chose to cover the TAPP laparoscopic approach since the TEP repair has recently been described in detail [1] and is not used routinely in Denmark. The robotic approach is the same as a TAPP repair just with the robot as a technical interface.

For elective operations, it is sufficient to master a laparoscopic technique, the Marcy repair, and

the standard and modified Lichtenstein techniques (Figure 1). In acute cases where bowel perforation may be present, it is necessary to also master some of the “old” non-mesh-based techniques (Table 2) such as the Bassini, McVay, and Shouldice repairs, and also some special variations not described in the present paper.

The Marcy repair is used for lateral hernias in adolescents and young adults, and in lateral hernias in adults with a contaminated field. The Lichtenstein repair is used for medial and lateral hernias in adults, and the modified Lichtenstein is used for open femoral hernia repair. The laparoscopic approach can be used for all hernia types in adults. In general, however, an open approach is chosen for a recurrent hernia if the primary repair was laparoscopic, and vice versa [23].

The open Lichtenstein repair [3] is renowned for its simplicity and effectiveness, making it a gold standard for open inguinal hernia repair. It offers a low recurrence rate and is feasible under local anesthesia, which can be particularly advantageous in patients with contraindications to general anesthesia. However, it may be associated with more significant postoperative pain and a longer recovery period compared to laparoscopic approaches [14].

In contrast, laparoscopic techniques, both TAPP [4] and TEP [5], are associated with reduced postoperative pain, shorter hospital stays, and quicker returns to normal activities [14]. The TAPP repair allows for the examination of the entire peritoneal cavity, which can be beneficial in identifying other intra-abdominal pathologies. However, it poses a risk of visceral injuries and requires peritoneal closure to cover the mesh at the operative site. The TEP technique avoids the peritoneal cavity entry, potentially reducing the risks associated with TAPP. However, it requires specialized training due to the limited working space and the technical difficulty of creating and maintaining the preperitoneal space. Both laparoscopic techniques require a high level of skill and familiarity with laparoscopic instruments and principles. The learning curve for laparoscopic repairs is steeper compared to the open approach [14]. Training programs must ensure adequate exposure and hands-on training for trainees in these techniques.

In conclusion, the choice between the different operative techniques involves a balance between clinical outcomes and the surgeon’s expertise. As surgical technology and techniques evolve,



continuous learning and adaptation are necessary for surgeons to provide the best care for their patients. For the elective setting, the trainee surgeon should master or be knowledgeable on the Marcy repair, the standard and modified Lichtenstein repairs, and one of the laparoscopic techniques.

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