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Surgery Illustrated – Surgical Atlas
The Shouldice natural tissue repair for inguinal hernia

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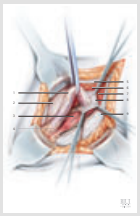
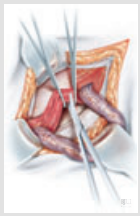
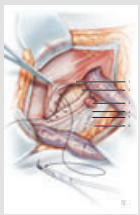
ILLUSTRATIONS by STEPHAN SPITZER, www.spitzer-illustration.com





PLANNING AND PREPARATION

The finding of a lump is perhaps the best indication of a hernia. A diagnosis by ultrasonography can be misleading and lead to an unnecessary operation. This introduces the question of what is an inoperable defect, as defined by size or symptoms. As to size, ultrasonography might reveal a very small finding, causing no symptoms. This is better left for 'watchful waiting', but the patient is burdened with the knowledge he has a 'hernia'. This finding might be within the confines of 'normal' and best left untouched, again 'watchful waiting'.

Discomfort and pain in the groin can be due to other causes. A tendinitis or tearing of the insertion of the rectus pyramidalis or adductor longus a so-called 'sportsman's hernia' can be improperly diagnosed as a hernia.

The groin is a complex area, and hernias can be rather easy or very difficult, according to the patient's anatomy, size of the defect and surgeon's experience. In the dissection, proper freeing of the sac and special attention to the floor of the canal are critical.

There is one critical step in successfully repairing a hernia, i.e. the dissection. A particular routine, as described here, has proven itself over many years. The chances of success in hernia surgery depend on the dissection, for without a proper dissection there can be no proper repair.

Of 1000 recurrences that presented at the author's institution for repair, a third were indirect and two-thirds direct; 12–13% of all primary inguinal hernias have a secondary

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component. Before suturing, a secondary component should be sought, and this will lower the recurrence rate.

The vast majority of hernia repairs are operations of election, which presents the opportunity to prepare the patient for surgery. Comorbidities are investigated and the operating surgeon should be satisfied that the possibilities of complications are minimal.

Overweight patients are more difficult to operate on and this can contribute to complications. To provide the best chance for success, patients are asked to help by attaining a reasonable weight; health insurance tables are a reasonable guide. Proper or reasonable weight is a factor in our continued success.

SPECIFIC EQUIPMENT/MATERIALS

Stainless steel wire 32–34 G is the suture material of choice, and originally chosen because it is inert and does not form a nidus of infection, should one occur. Initially the wire can be difficult to handle but this problem is soon overcome. Currently there are several suture materials that could be used. Mesh is a great product and certainly presents the surgeon with the opportunity to repair large and difficult hernias where there is insufficient natural tissue to achieve a successful repair. The use of mesh is necessary when the inguinal ligament is missing, but otherwise it is a very rare situation where mesh should be used in the groin. There have been too many cases where mesh complications have left patients with chronic pain and all of its deleterious effects on quality of life.

SURGICAL STEPS

For all groin hernias, a specific routine of surgical steps enables a smooth-flowing dissection. It prevents omitting such vital features like discovering the secondary hernia, found in 12–13% of cases.

Figure 1

Indirect Inguinal Hernia

1 Indirect hernia
2 Iliohypogastric nerve
3 Cremasteric tissue
4 Shelving border of inguinal ligament
5 External oblique
6 Internal oblique
7 Ilioinguinal nerve
8 Cuff of transversal fascia surrounding the cord
9 Flap of external oblique

At the internal ring there is a cuff of transversalis fascia surrounding the spermatic cord. Free the cord of this tissue. The floor of the canal covered by cremasteric tissue may also hide a second hernia.

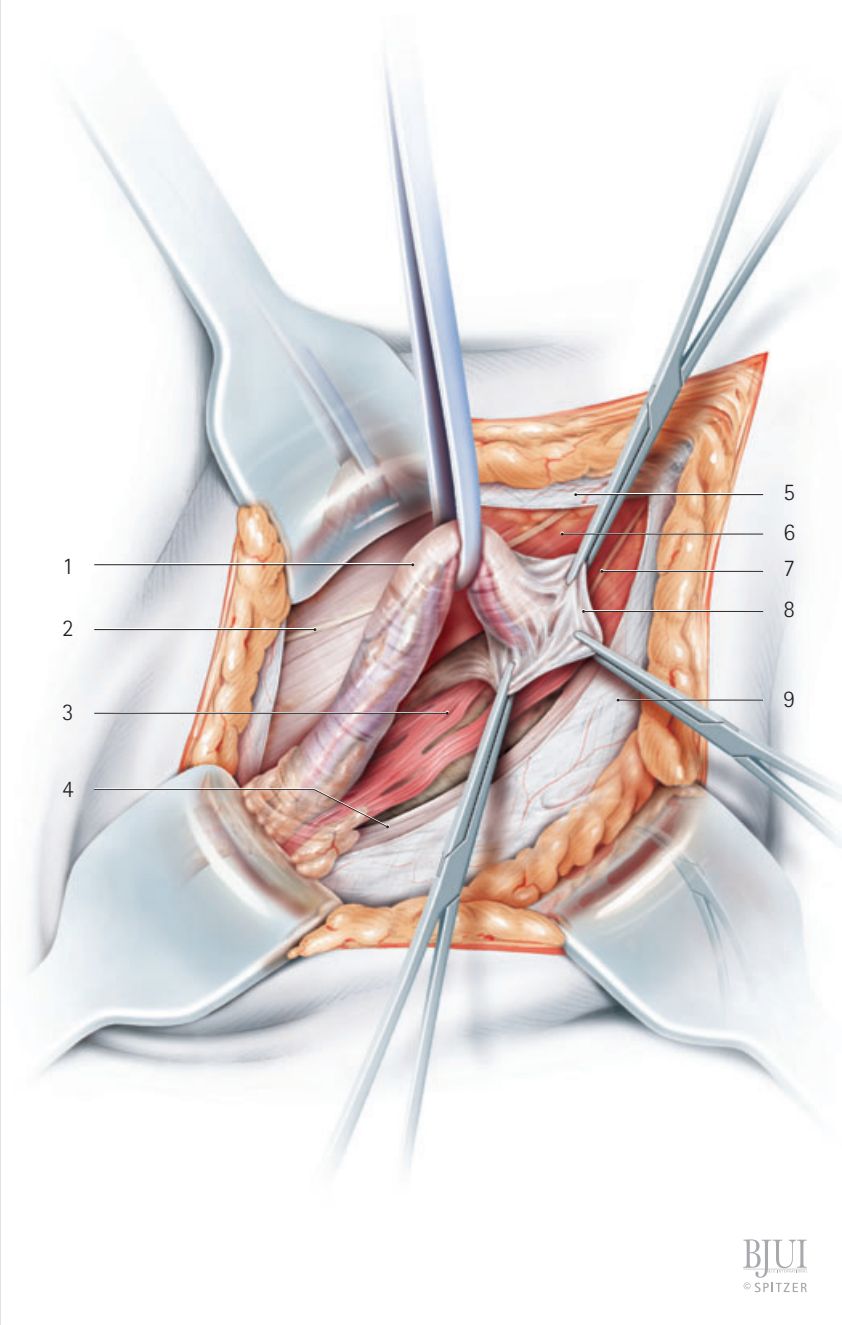


Figure 2

Indirect sac/peritoneal protrusion.

Peritoneum is always present on the cord at the internal ring either as an indirect hernia or as a protrusion of peritoneum. In either case it has to be freed and reduced into the abdomen. If the sac is difficult to free from the cord, divide it and leave the distal portion intact. This prevents unnecessary trauma to the cord. Some sacs may be very thin and difficult to find. Freeing the peritoneum and reducing it assures no missed indirect hernia which are the findings in a third of all recurrences.

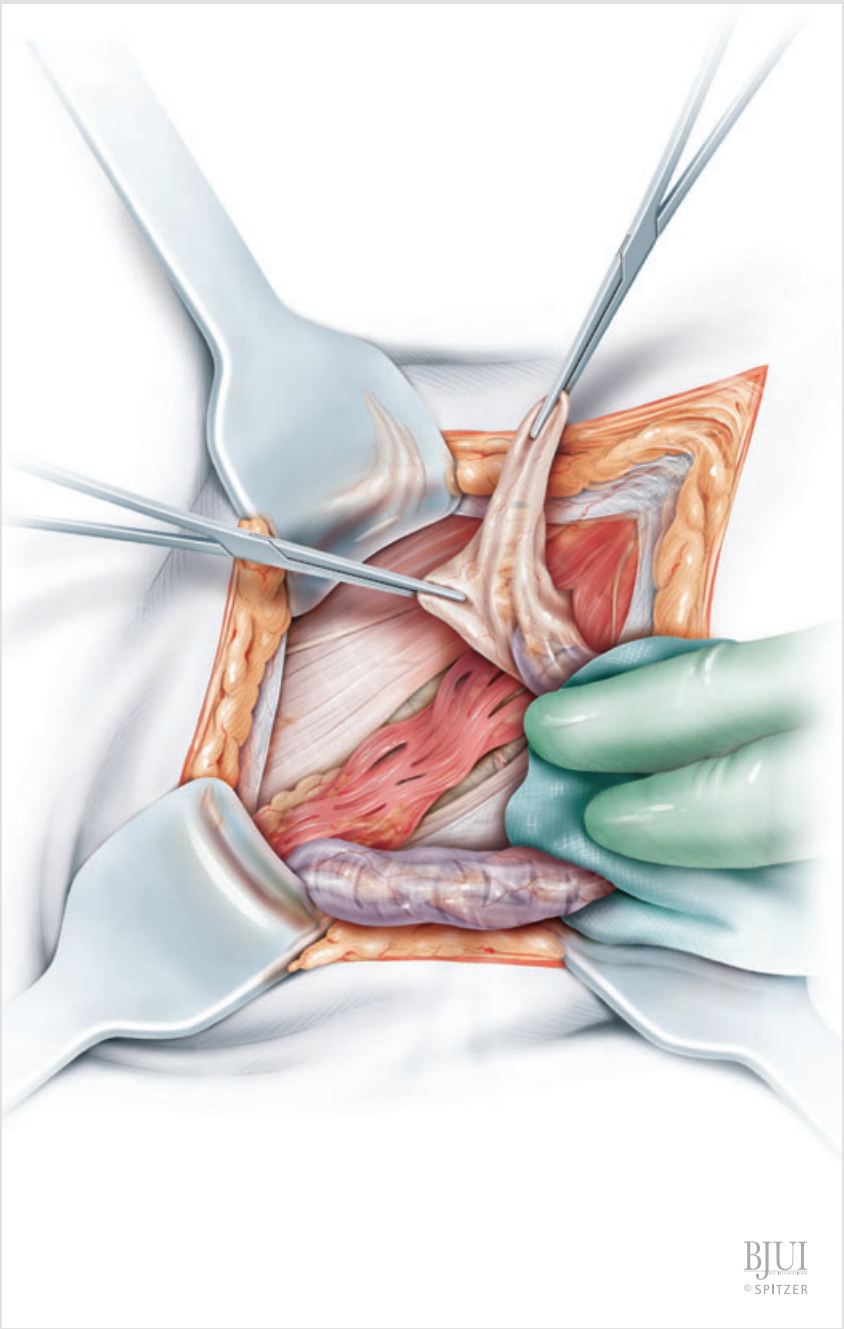


Figure 3

Divide the cremasterics.

The floor is obscured by cremasteric tissue (vessels, muscle and genital branch of the genitofemoral nerve). Removing this tissue gives an uninhibited view of the posterior wall where two-thirds of missed hernias are found. The cremasteric tissue is divided leaving the distal end long enough to support the testis, thus avoiding a dependent testis and the proximal stump reasonably short to be incorporated to a newly formed internal ring.

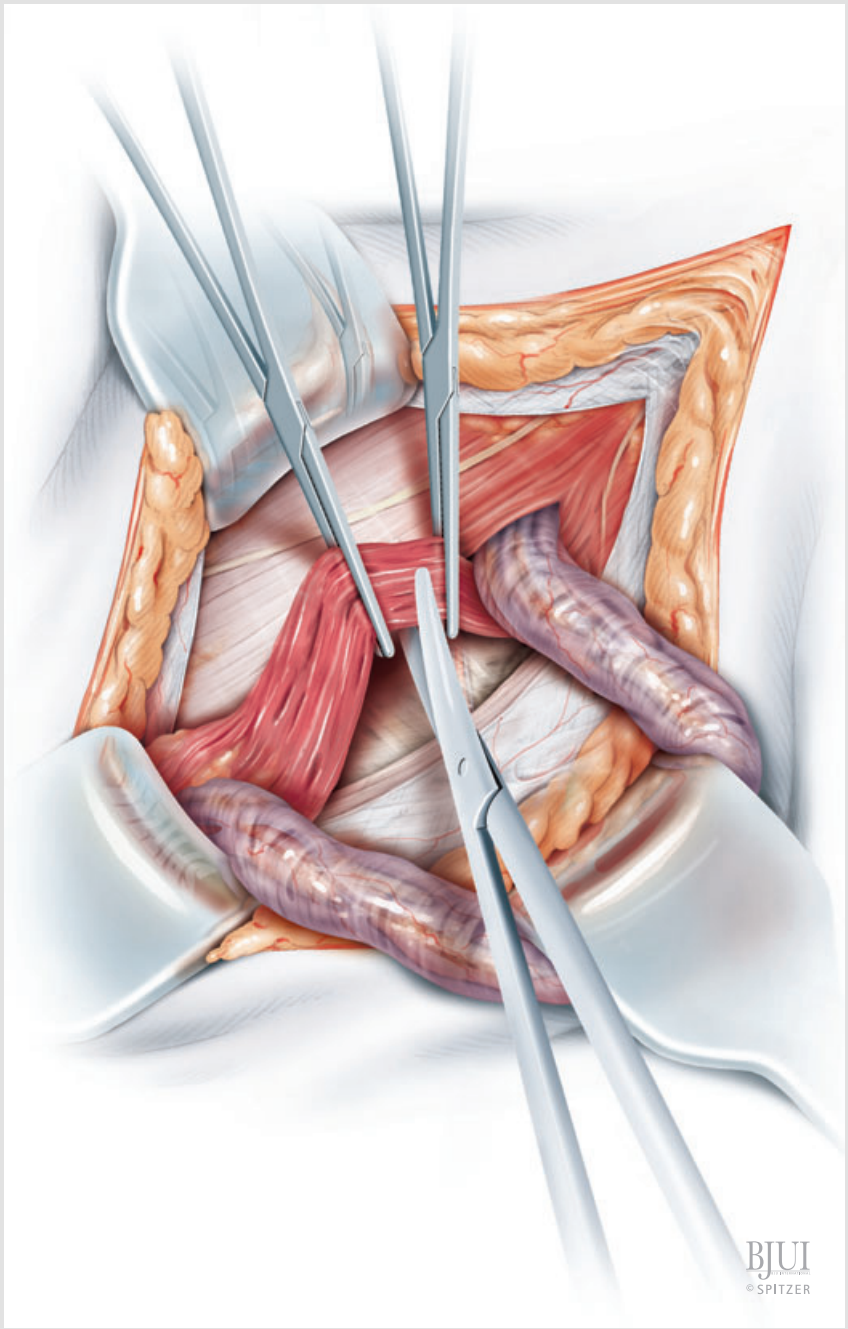


Figure 4

Splitting the transversalis fascia is rare in women and essentially never in children. This fascia needs to be divided far enough to be able to assure the surgeon of its strength medially and consequently no missed hernia. When splitting transversalis fascia remember it is multilayered. The fascia is split to develop a wide lateral flap which is necessary for the repair. It also enables proper viewing of tissue to be sutured. Beneath this fascia lie small vessels and the marginal vein which may require securing.

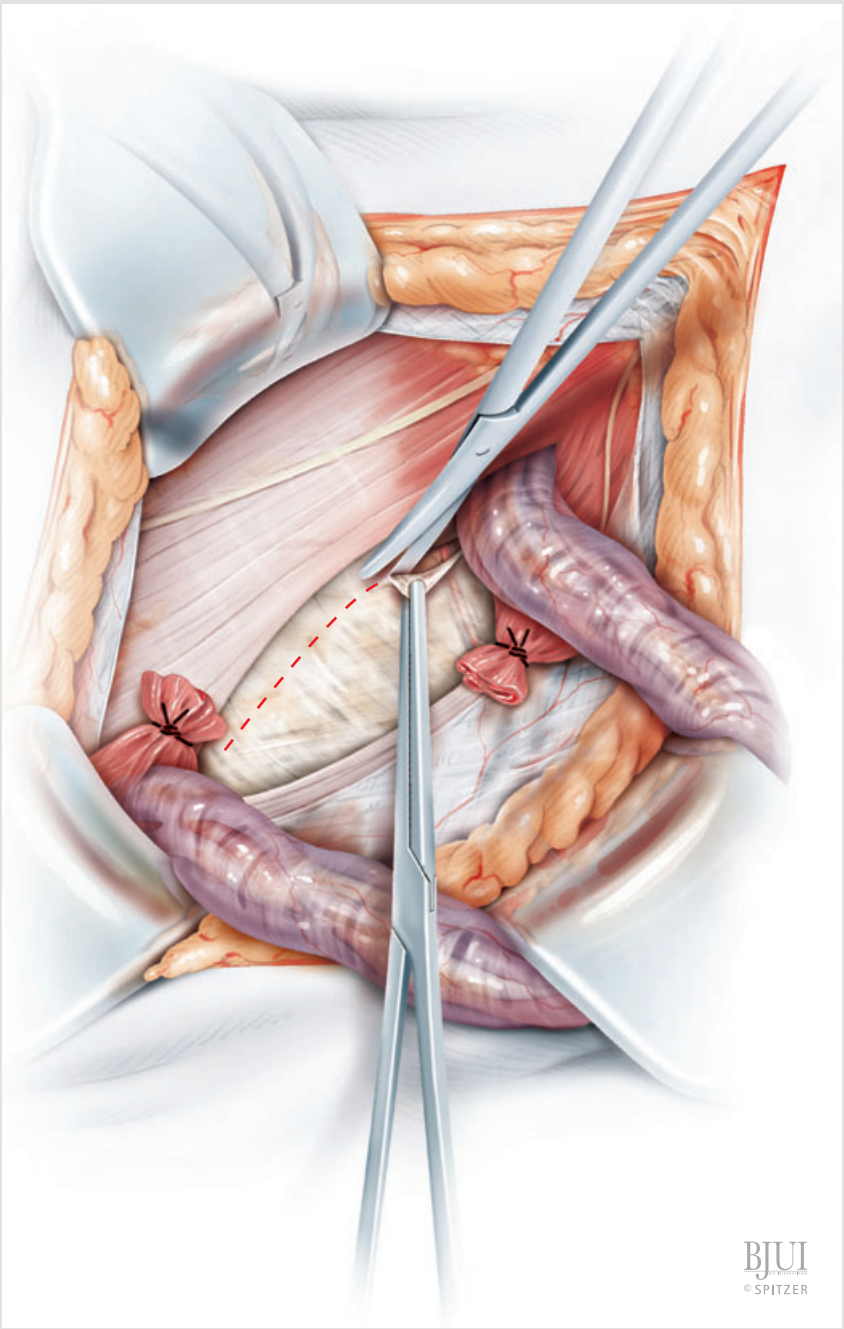


Figure 5

Transversalis fascia split.

When this fascia is split and its deep surface is cleaned of adherent fat, suturing can begin. First check for that elusive secondary hernia, possibly a femoral or a rare interstitial. In the medial third of the floor, where most direct recurrences develop, the transversalis fascia is of good quality but thins considerably as the site of the future internal ring is approached. The initial suture through the transversalis fascia is placed by the bone; periostium is avoided. The suture is carried through the edge of rectus medially.

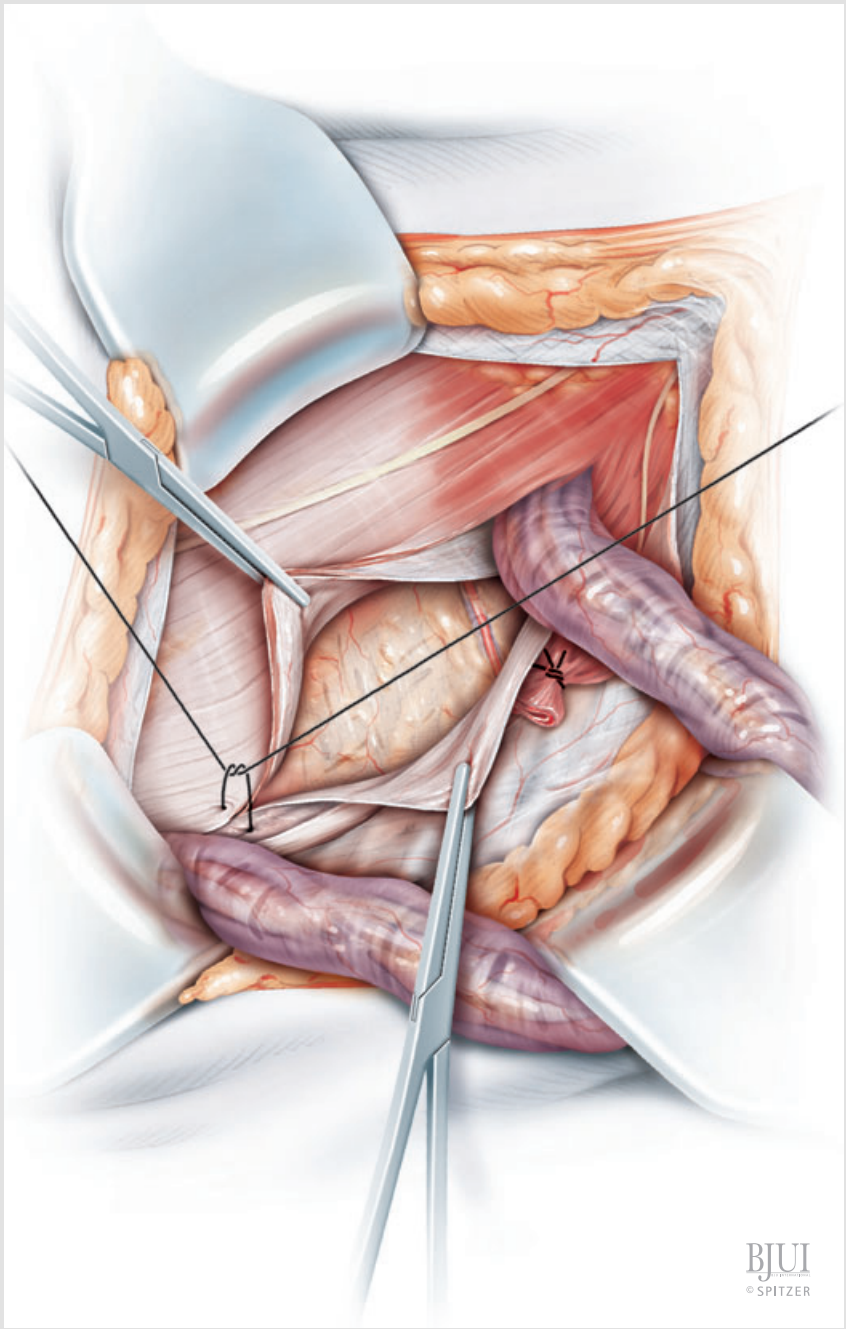


Figure 6

First line of the repair

1 Flap of internal oblique, transversus abdominus and transversalis fascia
2 Epigastric vessels
3 Cremasteric stump
4 Transversalis fascia
5 Shelving border of inguinal ligament
6 Flap of external oblique

This initial suture line, apart from retaining intra-abdominal fat, anchors the repair very firmly at its medial and lateral ends. It also serves to develop an all-important flap of tissue medially. The lateral flap of transversalis fascia is carried to the deep surface of the medial lying muscle mass (the triple layer). This develops a flap of tissue used for the second line of repair.

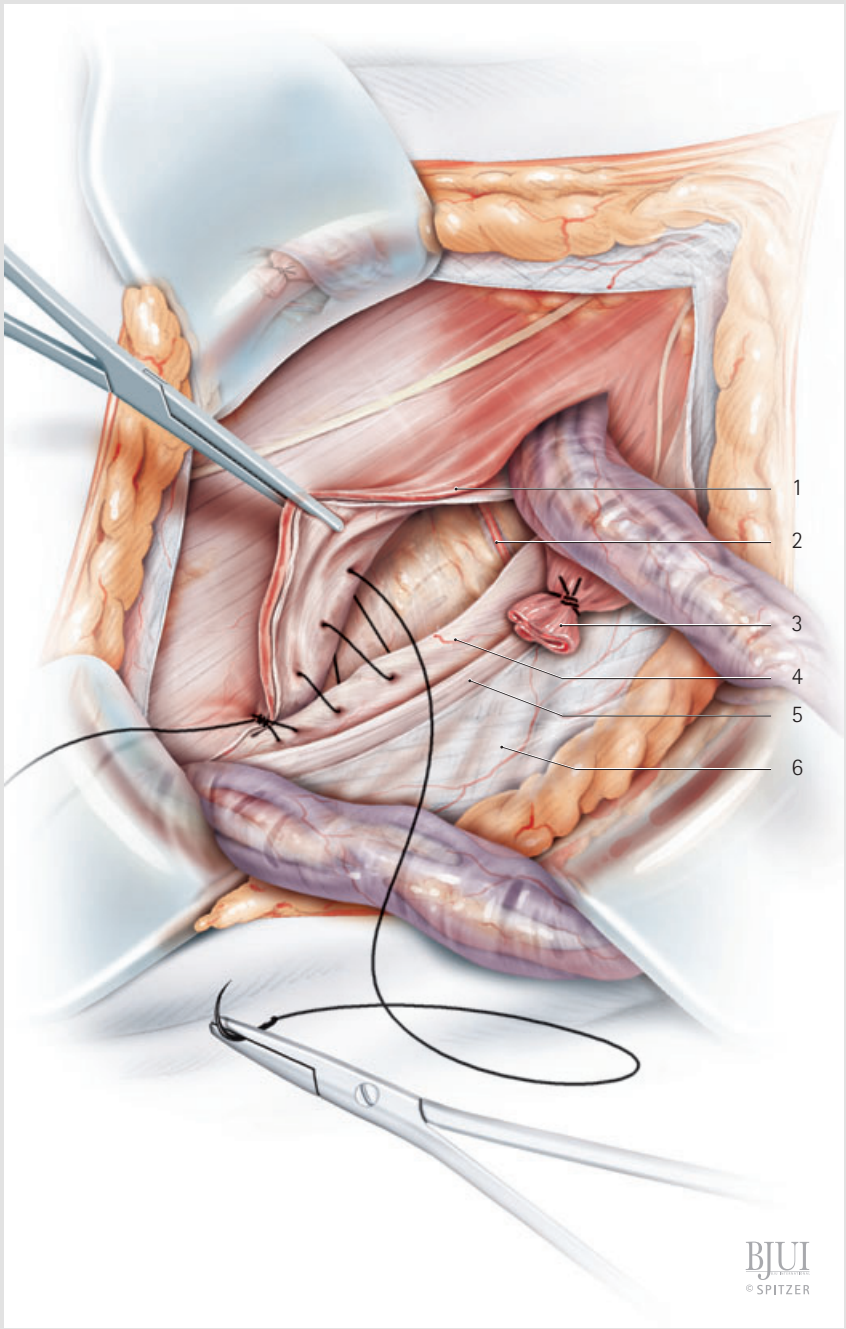


Figure 7

Finishing the first line of the repair.

The internal ring is formed by picking up transversalis fascia and the proximal stump of cremasteric tissue. The latter is formed by an extension of internal oblique muscle and transversalis fascia, which becomes the internal spermatic fascia. These tissues are carried to the deep surface of the triple layer. The suture is brought through the full thickness of the muscle mass ready for the second line to begin. This helps to create a cylinder for an internal ring which, upon contraction of internal oblique, also acts as a sphincter. There is absolutely no need to try to close the ring and create strength in the repair by pulling the suture tight. This only serves to strangle the tissue. Small bites of tissue are mandatory; there is no need to make the ring tight.

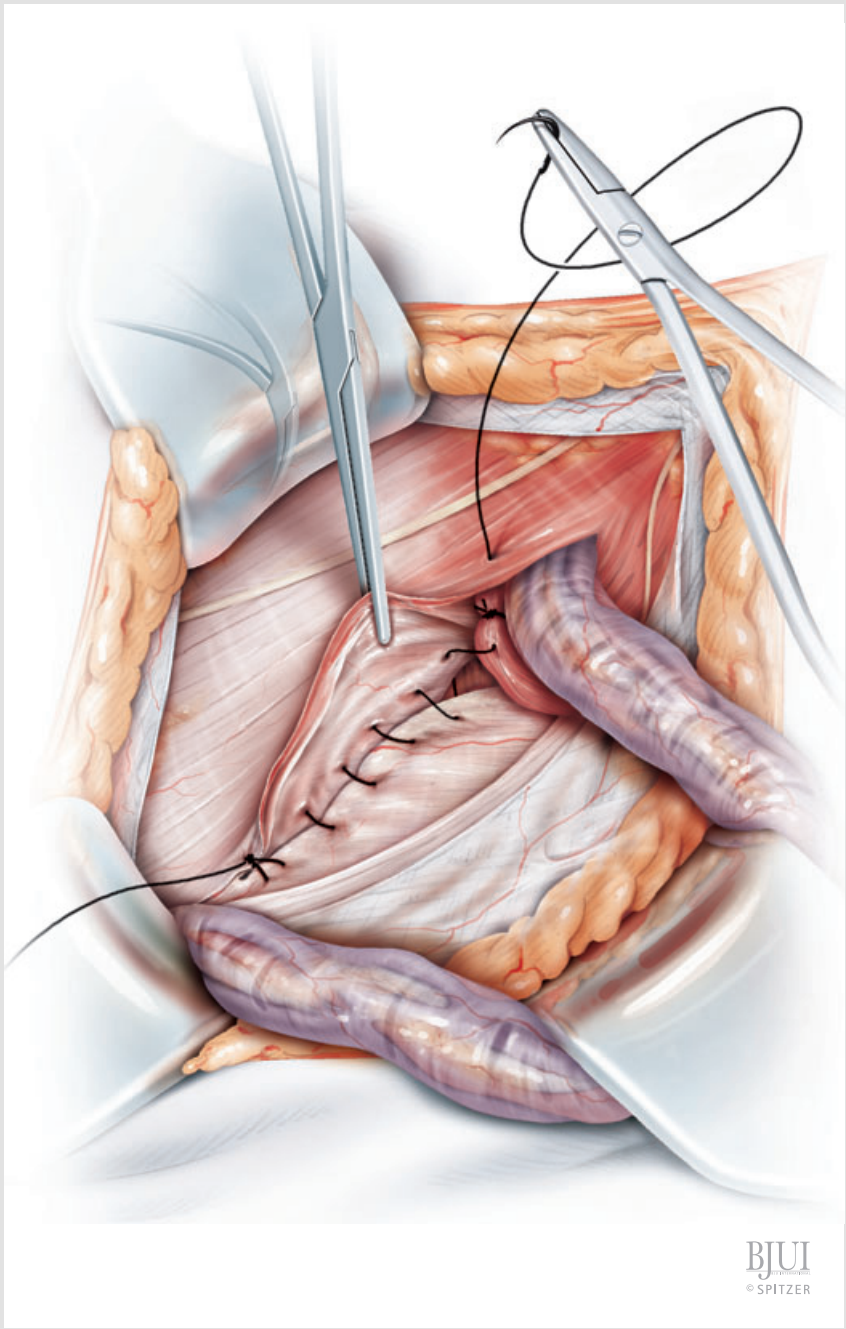


Figure 8

Second line of the repair.

The suture is reversed and the second line begins by carrying the developed flap medially to any or all of the iliopubic tract, transversalis fascia and inguinal ligament near its shelving or reflected border. Be careful of the femoral vessels lying just beneath at the internal ring. Do not use the needle tip to dig for tissue to be sutured. The medial lying flap of tissue is carried deeper as the bone is approached. The floor now consists of two layers. The original transversalis fascia and this new reinforcing flap of tissue form an extension of the triple layer.

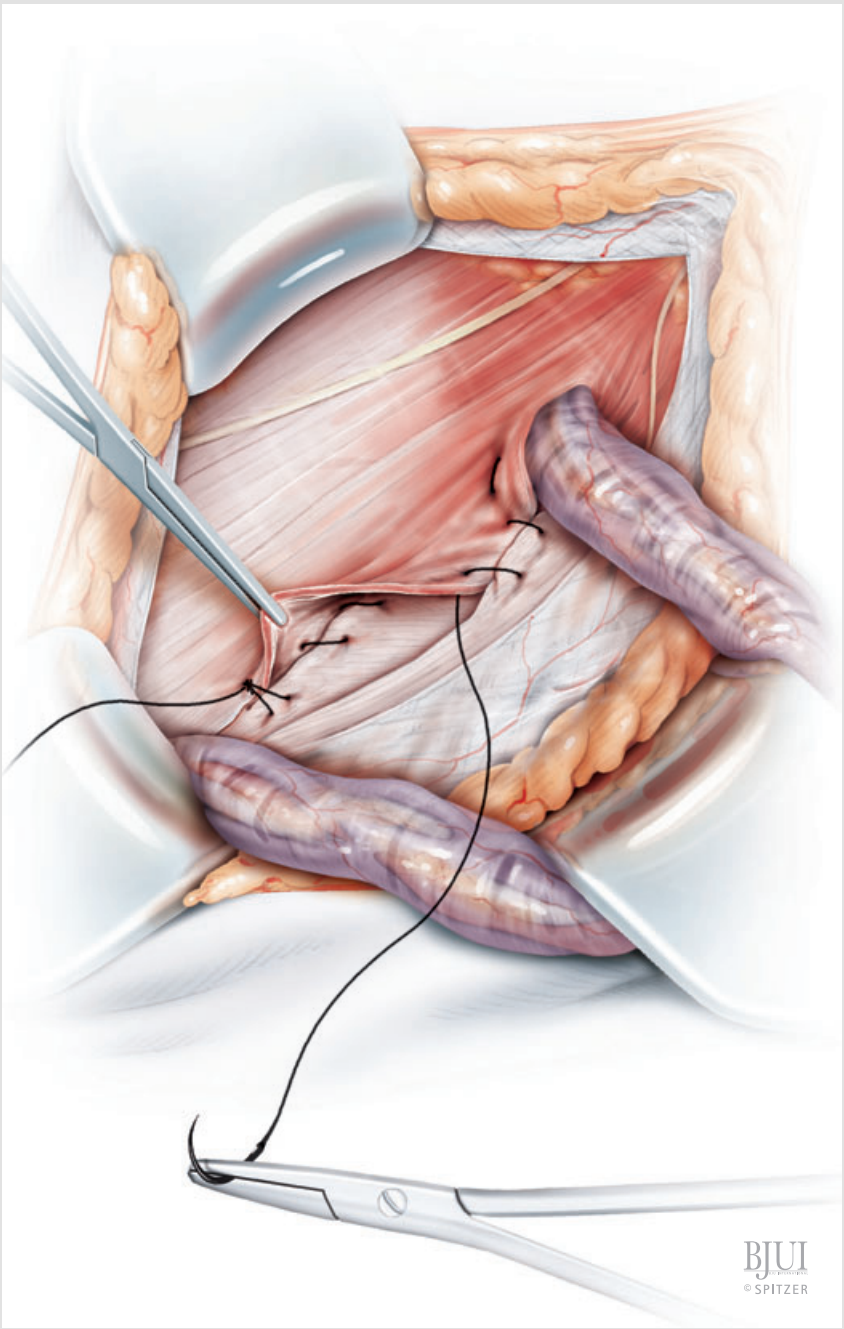
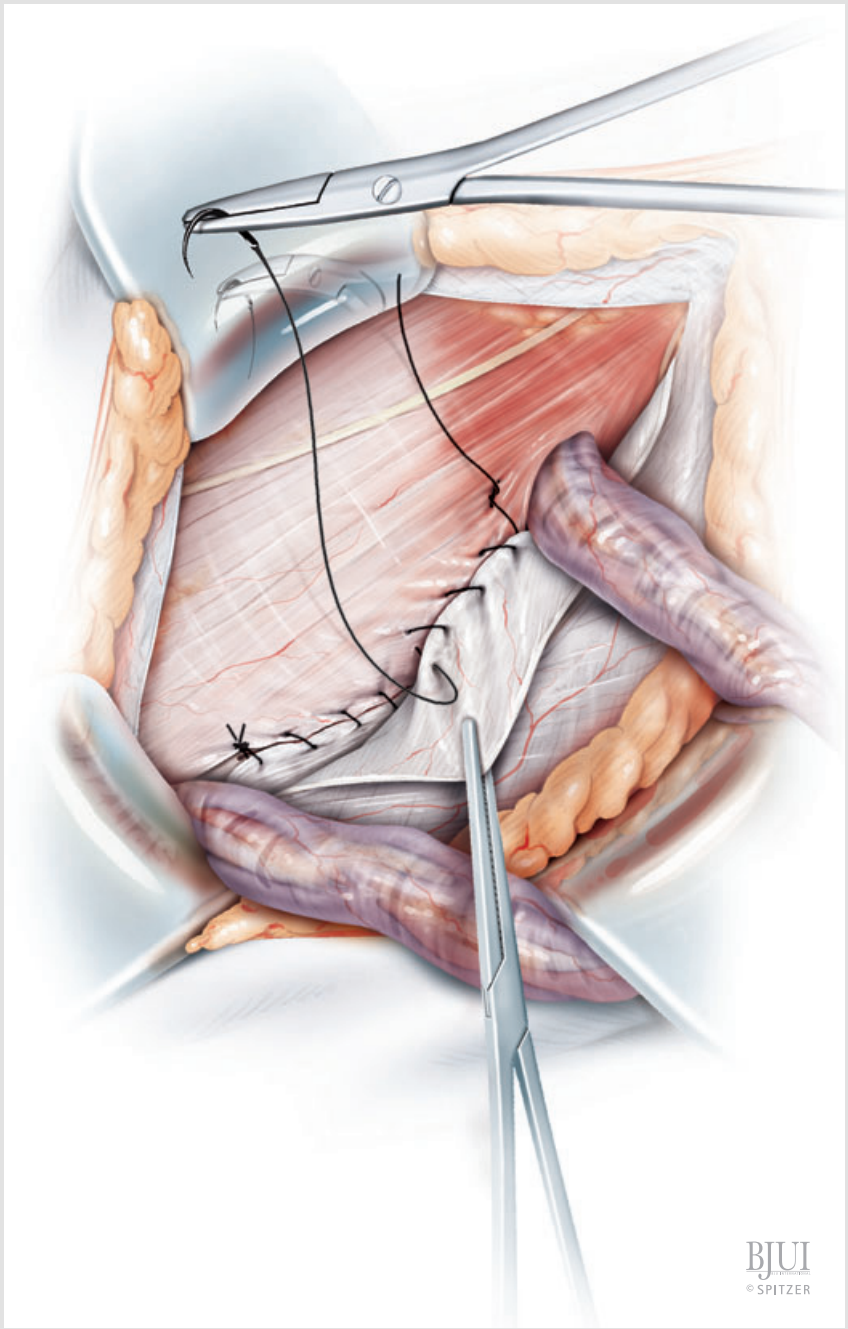


Figure 9

Third line of the repair.

Starting at the internal ring, the lateral flap of external oblique is replaced over the internal oblique and covers the previous suture lines. A small portion of this tissue is left free to accommodate the spermatic cord. Direct recurrences occur mainly in the medial portion of the floor near the bone. Particular attention is paid to ensure the external oblique fascia is carried well medially by the bone to reinforce this area. The fourth line duplicates the third in reverse. The cord is then covered by external oblique.



POSTOPERATIVE CARE

Immediate ambulation off the operating table has both positive physiological and psychological effects; the former by increasing circulation and the latter reassures the patient that all is well, his repair is firm and he should move around. However, after returning to his bed some time is necessary for medications to wear off and to minimize the risk of falls.

Postoperative medication is usually minimal, with 37% of patients requiring nothing, while others might require acetaminophen 1000 mg every 6 h, codeine 30–60 mg every 4 h, or large difficult procedures might require oxycontin 10–20 mg every 12 h. The patient is told to be active within reason, as his repair is firm and discomfort is the only defining factor.

FROM SURGEON TO SURGEON

Overweight patients and larger defects contribute to difficult surgery and, as I use local anaesthetic, young muscular cases can be trying. Recurrences where mesh was previously used can be very difficult. I also wait a year after any previous surgery to allow the wound to mature. Patient weight loss, as noted, can be a major factor in easing the surgeon's life. Complying with a routine as described, with patience, will ensure success.

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