

THE  
IRISH JOURNAL OF  
MEDICAL SCIENCE

FORMERLY  
THE DUBLIN JOURNAL OF MEDICAL SCIENCE.

THE OFFICIAL ORGAN OF THE ROYAL ACADEMY  
OF MEDICINE IN IRELAND

---

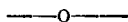
---

FIFTH SERIES.      No. 9.      NOVEMBER, 1922

---

---

*Original Communications.*



THE RADICAL CURE OF INGUINAL HERNIÆ.

BY R. V. SLATTERY.

IN the *Lancet* of September 22nd, 1917, I published a short account of an operation for the radical cure of inguinal herniæ, in which I advocated a method of repair of the damaged fascial floor of the inguinal canal. With further experience of this operation I am more than ever convinced that repair of the innermost layer, *i.e.*, the floor of the inguinal canal should be the chief aim of all radical procedures for the cure of inguinal herniæ.

The damage to the fascial floor of the inguinal canal resulting from a hernial protrusion is well defined, and easily demonstrated. We must also consider the further damage due to operation. Thorough separation of the sac at the internal ring will increase the size of that ring—indeed it is no infrequent occurrence after ligation of the sac to find the deep epigastric vessels visible behind the structures of the cord, emphasising the extent of the damage. (See fig. 1.)

In addition, the transversalis muscle and fascia following the universal rule are now retracted high under the internal

oblique muscle. Is it not easy to understand in view of this weakening of the floor, and retraction of the transversalis muscle, that examination of the inguinal canal at this stage will give a false impression of the value of the fascial floor ?

This operative damage to the inguinal canal accounts for the unusually large size of the internal ring in recurrent cases.

Contrasting a normal inguinal canal with one damaged by a hernial protrusion we find in the normal inguinal region, the fascial floor is well developed ; it bridges the space between the transversalis muscle and Poupart's ligament ; it is part of the extra-peritoneal fascial lining of the abdominal cavity. Half an inch above mid-Poupart is a small aperture in this fascia—"the internal abdominal ring." This aperture is normally situated under the supporting fibres of the internal oblique muscle.

During abdominal strain the transversalis muscle contracts, and owing to its insertion into the iliopectineal line, when it approximates to Poupart's ligament, it tends to overlap that ligament ; the fascia transversalis is relaxed, and is supported by the strong muscular fibres of the internal oblique muscle, which is also approximated to Poupart. The external oblique gives additional support. The inguinal canal is, therefore, a valvular structure, and the main constituents of that valve are the fascial floor of the canal and the strong lower muscular fibres of the internal oblique which supports the fascia during strain. The efficiency of the protection afforded by this arrangement is evident, and in fact is granted by all who believe that a preformed sac is essential to the formation of an oblique inguinal hernia.

The pathological changes in the inguinal region which result from an oblique hernial protrusion are, briefly, as follows :—

1. There is a protrusion of peritoneum—the sac.
2. The internal abdominal ring enlarges in an inward and upward direction.
3. The transversalis muscle is displaced upwards.
4. The internal oblique, as a rule, is but little altered.
5. Later, the external abdominal ring enlarges.
6. The obliquity of the canal tends to disappear.

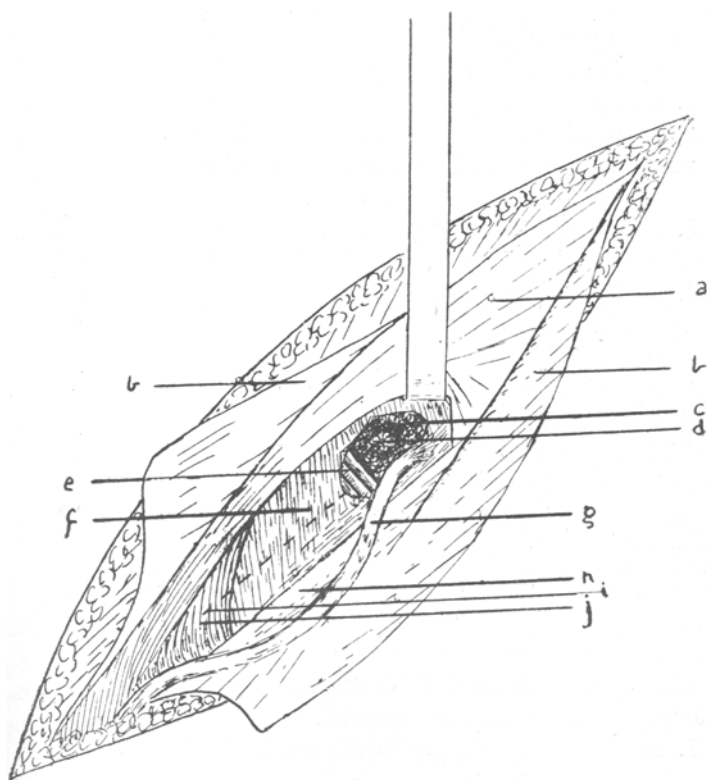


Fig. 1.

*a*, internal oblique; *b*, external oblique; *c*, opening in transversalis fascia produced by isolating the hernial sac; *d*, ligated neck of sac; *e*, inferior epigastric vessels; *f*, fascia transversalis; *g*, spermatic cord; *h*, inguinal (Poupart's) ligament; *i*, line of incision in fascia transversalis; *j*, falx aponeurotica inguinalis (conjoined tendon). This diagram shows the large internal ring left after complete separation of the sac.

Of all these changes enlargement of the internal abdominal ring is the most marked. It is rare to meet an internal abdominal ring in an oblique inguinal hernia which will not admit, with ease, two fingers. In old-standing cases, the internal ring is, of course, much larger.

The anatomical aim of the operation which I am about to describe is as follows :—

1. To reform the fascial floor of the inguinal canal.
2. To repair the damaged internal abdominal ring, leaving it where it is situated in a normal case under the supporting fibres of the internal oblique muscle.
3. To approximate the muscles inserted into the conjoined tendon to Poupart's ligament.
4. To restore the obliquity of the inguinal canal.

Approximation of the muscles inserted into the conjoined tendon by stitching the muscular fibres of the internal oblique to Poupart's ligament is not a procedure that recommends itself to me. I fail to see how permanent union can occur, and I have never seen evidence of such in a recurrent case. At best it can only serve as a temporary splint for the large internal abdominal ring, which lies beneath it unrepaired. In addition, such sutures tend to damage the muscular fibres of the internal oblique, a most important muscle.

#### *Description of Operation.*

The Trendelenburg position facilitates the operation, and, where possible, should be adopted.

1. The external oblique aponeurosis is exposed as in Bassini's operation. Before dividing it the anterior aspect of Poupart's ligament is exposed.
2. The external oblique is incised from the external ring to slightly beyond the internal ring.
3. The sac is freed from the surrounding fascias and cord *starting at the internal abdominal ring*. If small, the sac is ligated and removed : if large, or very adherent, the sac is ligated at the internal ring, and divided ; the lower end is left.
4. The cord is freed from its bed, and retracted upwards, exposing the fascial floor of the inguinal canal.
5. The fascial floor of the inguinal canal is incised midway

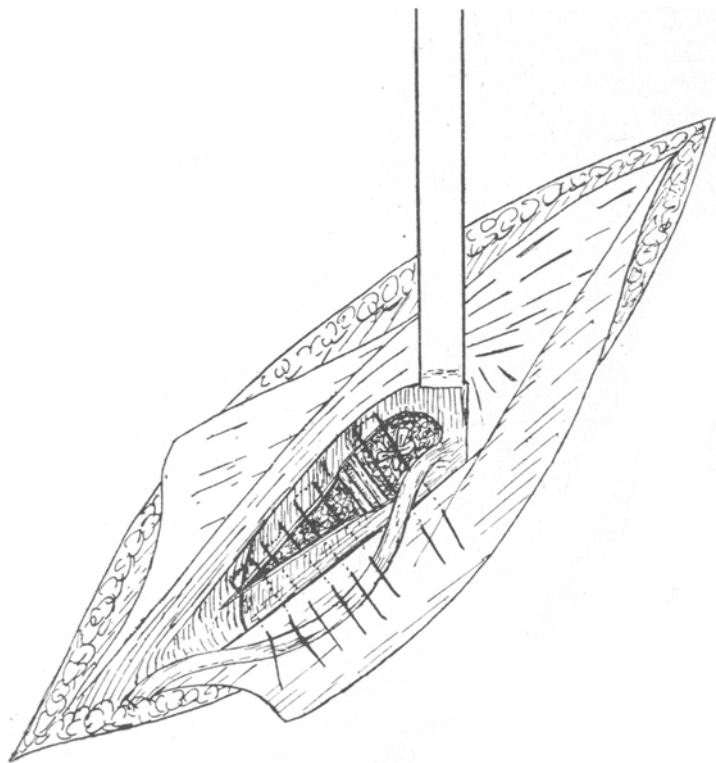


Fig. 2.

Suture of the fascia transversalis. The mattress sutures are represented as emerging on the deep aspect of the inguinal ligament for convenience of representation. The free ends, in the operation, are brought *through* the inguinal ligament and are tied on its *superficial* aspect. The medial suture includes the conjoined tendon.

between Poupart's ligament and the structures of the conjoined tendon, care being taken not to damage the deep epigastric vessels. This incision is carried into the enlarged internal abdominal ring.

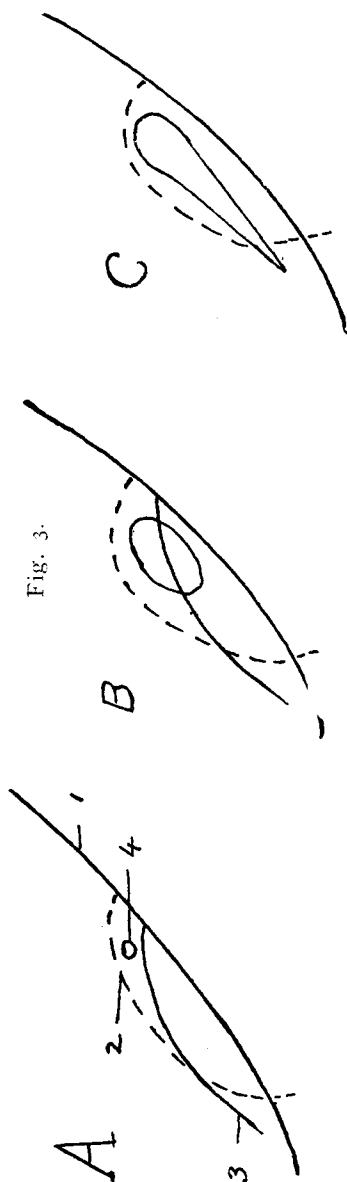
It is essential to thoroughly divide the fascia transversalis. This is accomplished when you reach the retroperitoneal fatty tissue, which, when the patient is Trendelenburged will fall away from the fascia transversalis bringing with it the deep epigastric vessels.

6. The fascia transversalis is freed gently from the retroperitoneal fatty tissue, both upwards under the conjoined tendon, and downwards to expose the deep aspect of Poupart's ligament.

7. The fleshy arch of the internal oblique muscle is retracted upwards, and tissue forceps are applied to the divided fascia transversalis beneath it. This fascia is drawn into the wound, and it brings with it the lower aponeurotic portion of the transversalis muscle. The lower flap of the transversalis fascia is drawn forwards with Poupart's ligament.

8. Mattress sutures—four generally suffice—are used to approximate the fused fascia and aponeurosis to the deep aspect of Poupart's ligament, the innermost suture being introduced first.

The aim of this suture is to unite the lower tendinous border of the transversalis muscle with its the attached transversalis fascia to Poupart's ligament. The next suture also unites to Poupart the fused tendinous lower border of the transversalis muscle and fascia. The two outer sutures unite strong fascia transversalis to Poupart's ligament. These sutures should be passed deep to the lower flap of the transversalis fascia, as it is important that this should not intervene between Poupart's ligament and the structures to be united to it. By carefully drawing Poupart's ligament forward, and passing the needle from within outwards to emerge where Poupart's ligament blends with the fascia lata of the thigh, these sutures are easily and safely introduced. When tying the mattress suture nearest the internal abdominal ring, care must be taken not to narrow that ring unduly. I have never seen pressure symptoms result even when the reformed ring will not admit the tip of a finger. When these sutures are tied



1. Inguinal ligament.
  2. Edge of transversalis muscle.
  3. Edge of internal oblique muscle.
  4. Deep abdominal ring.
- A. Normal relations of edges of internal oblique and transversalis muscle to deep abdominal ring.
- B. Shows deep abdominal ring enlarged and upward displacement of edge of transversalis muscle.
- C. Shows incision in transversalis fascia.
- D. Shows mattress sutures in situ.

it will be seen that the internal oblique, as well as the transversalis muscle, are closely approximated to Poupart's ligament, and that there is a sound floor to the inguinal canal.

9. The cord is allowed to fall back into its bed.

10. The external oblique aponeurosis is stitched up, and the wound closed.

When the transversalis fascia is divided, examination of its inner surface, which is normally in contact with the retro-peritoneal fatty tissue, is instructive. The muscular belly of the rectus can be seen shining through its thin layer of fascia, below is the tendinous innermost layer of the transversalis muscle, and its attached fascia. When the transversalis fascia, now demonstrated, is held in a forceps, it will be quite easy to demonstrate that it is a strong structure, almost as strong as the post sheath of the rectus abdominis in its upper third. This little examination of the inside of the conjoined tendon gives the only true insight into the importance of the structures forming the floor of the inguinal canal.

For the operation just described, I claim the following advantages :—

1st. The normal anatomical structure of the inguinal canal is not altered ; the distance between the internal abdominal ring and the external is not diminished. The internal abdominal ring lies under the supporting muscular fibres of the internal oblique.

2nd. There is freedom from pressure on the cord with thorough repair of the internal abdominal ring, as the structures of the cord in that region are of very small bulk.

3rd. Convalescence is rapid.

I never give special instructions to refrain from work when the patients leave hospital, and I have not had, as far as I am aware, any cause for regrets,

4th. The operation is applicable to all oblique and direct herniæ.

I cannot now recollect a case where the internal ring was too large for repair by the method I have described. The muscles inserted into the conjoined tendon are left in the position that normally obtains during strain. A pillow under the thighs will relax the abdominal wall during convalescence.



Separation of a sliding hernia at the internal abdominal ring presents no difficulty when the transversalis fascia is incised. Separation from the structures of the cord is still a difficulty, but once the cord is free the fascial floor can be incised, the hernia freed from the internal ring and reduced, and the floor repaired in the way described.

Repair of a direct inguinal hernia by the method described is a simple operation, there is no adhesion to the structures of the cord. In the common variety, *i.e.*, the external direct hernia, the fascia transversalis is stretched and thinned by a hernial protrusion; it is rarely necessary to open or ligate the sac when freed from the thinned fascia, the peritoneum will fall into the abdominal cavity and being an elastic membrane will contract. The fused lower border of the transversalis fascia and muscle can then be sutured to Poupart's ligament, making a sound floor for the inguinal canal.

To complete this paper, apart from statistics which must come in a further contribution, I feel I must say a few words on recurrence, following operations for inguinal hernia.

Recurrence when the floor of the inguinal canal is not repaired depends on the patient's occupation. After the Bassini type of operation in a healthy patient leading a life in which he is not subject to *undue* strain, recurrence is rare, a tribute not to surgery but to the valvular structure of the inguinal canal. When such a patient is subject to strain, recurrence may come on 15 or 20 years after operation, as the unrepaired internal ring is even then a weak spot.

I remember an elderly American Serb, aged 45, whose case was of particular interest. 15 years before his admission to hospital, he had a Halsted operation performed with apparent success. After six months in the trenches a large direct hernia developed at the internal abdominal ring. Its cure presented no unusual difficulty. The cord was replaced in the inguinal canal.

Absence or deficiency of the conjoined tendon is a condition which I have never been able to demonstrate on thorough examination of a very large number of inguinal canals.

Retraction of the transversalis muscle simulates this condition.

In conclusion, I always regard the inguinal canal as a par-

ticularly strong part of the abdominal wall, whose repair presents no special difficulty if it is dealt with in the same thorough fashion as is usual in abdominal wall surgery, as for instance an umbilical protrusion. The peritoneum in the inguinal region requires the same treatment as peritoneum elsewhere, it must be supported by the extraperitoneal fascial lining of the abdominal cavity.

---

Since this was written, Mr. A. K. Henry has drawn my attention to two quotations from Poirier and Charpy's *Anatomy*, Vol. II., Part 1, 2nd Edition, 1901, which confirm important statements in my article.

"It is the posterior wall of the inguinal canal which must be reconstituted in the radical cure of hernia" (p. 490).

"The structure of the transversalis fascia is readily seen when its deep surface is examined" (p. 483). "This fascial layer is especially condensed and tendinous in the inguinal region owing to abdominal pressure, which in the erect posture is at a maximum in this area" (p. 482).

---