

THE REPAIR OF THE INTERNAL RING IN
OBLIQUE INGUINAL HERNIA*

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An understanding as to the various steps necessary in the repair of oblique inguinal hernia may be materially aided by a comparison of the relations of the normal structures with those in which a hernia exists; and these are shown in the following parallel columns and in Figures 1, 2, 3 and 4:

Structures.	Normal.	Hernia.
Parietal peritoneum.	Smooth and even..	Outward bulging, forming the sac.
Internal ring.....	Snugly surrounds cord.	Enlarged downward and inward, surrounds the cord and sac.
Internal oblique muscle.	Covers and protects the internal ring.	Does not cover, or only partially covers the internal ring.
Inguinal canal.....	Oblique, long and narrow.	Less oblique, shorter and wider.
External ring.....	Small and triangular.	Enlarged upward and round.

Radical operation for the cure of inguinal hernia should consist of an attempt to restore the various structures to their normal relations.

In the majority of operative methods in vogue at present no attempt is made to reproduce the anatomic relations, the result being an alleged improvement on Nature, as is exemplified by the Bassini method. Synchronous with and largely due to the teachings of Ferguson, there has been an increased employment of operative procedures in which the anatomic relations are more or less completely replaced, Nature being imitated in the attempt at cure.

The rationale of so doing has been well emphasized by various observers. For example: the removal of the sac at the neck with the redundant parietal peritoneum has been emphasized by many, but the etiologic importance of a congenital sac as brought out by Mr. Hamilton Russell¹ of Melbourne in his "saccular theory" is a most convincing argument in favor of this detail of the operative treatment.

The advisability of placing active, red muscle, the internal oblique, external to the internal ring, to act as a protection or check against the protrusion of viscera through the ring, we owe to Ferguson.²

That the inguinal canal must be long and oblique so that with increased intra-abdominal pressure the walls of the canal will be held in more intimate apposition, and hernia be prevented by a valve-like action of the canal, was perhaps first emphasized by Marcy.³

The necessity of the walls of the canal fitting snugly around the cord has been met by the imbrication or double breasting of the walls as applied to inguinal hernia by Andrews.⁴

The attempt to secure a strong and small external ring was a part of, and in some instances the entire aim of some of the early and incomplete forms of operation. The strength of the external ring has of late been assured by the incision of Mayo,⁵ which allows the preservation of the intercolumnar fibers of the external oblique.

A new internal ring is made in the majority of the operations now employed. But in an anatomic operation the original internal ring should be repaired, that is, (a) made smaller of suitable size properly to surround the cord after the removal of the sac, and of equal importance, (b) replaced to its normal position and in proper relation with the inguinal canal, and the external ring.

The internal ring may be diminished in size by suture of the transversalis fascia, either above or below the opening for the passage of the cord.

The suturing of the transversalis fascia from below upward, that is beneath the cord, was first performed in 1878 by H. O. Marcy.⁶

This detail was likewise a step in the "combination operation" reported by Ferguson⁷ in 1895.

But in the "typic or anatomic operation," a description of which was published by Ferguson in 1899, all the structures are replaced to their normal anatomic relations, with the single exception of the internal ring, which is depressed because of the advice that the internal ring be strengthened, "with a few stitches above the root of the cord."⁸

From inquiry and from observation I am led to believe that in many so-called Ferguson operations this detail, the minimizing of the internal ring, is often omitted, which may, in part, account for recurrence where this does occur.

When these stitches are placed above the cord, only one of the essentials for the repair of the ring is fulfilled, that is, the ring is made smaller. The lower and inner margin of the dilated ring, which is the most abnormal and displaced portion of the circumference, is used as the fixed margin; while the upper, the normal superior boundary, is brought together and displaced downward. In this way the ring while being made smaller is at the same time depressed (Figs. 5 and 6). So it would seem that diminution in the size of the internal ring by suture of the transversalis fascia above the cord does not constitute proper repair. While mere diminution in caliber is an important step in operation, the results would be still better if the ring were elevated to its normal position and relation at the same time that it is made smaller. And this is accomplished by placing the stitches beneath the cord, which pleat and reinforce the abnormally dilated and attenuated lower margin, while the superior margin, that portion of the ring that has not been stretched, dilated and displaced by the protrusion of the sac, is not interfered with but is used as the fixed margin.

The necessary stitches in the transversalis fascia, preferably of the mattress type, may be inserted and tied, in such a manner that the cord is not extensively separated from its attachments, and the knots may be placed to one side so that they will not irritate the cord.⁹ As a result the upper margins of a repaired ring and a normal ring are in the same relative position, which is at the proper distance above and external to the outlet of the canal.

This apparently trivial difference in the manner of repairing the internal ring will, with a study of the subject, be found to be of the utmost importance regarding the length and obliquity of the resulting inguinal canal.

* Read at the Western Surgical and Gynecological Association, Dec. 29, 1908.

1. *Lancet*, London, 1905, p. 7.

2. Ferguson, A. H.: *THE JOURNAL A. M. A.*, 1899, xxxiii, 6.

3. Marcy, H. O.: *Anatomy and Surgical Treatment of Hernia*, Appleton, 1892.

4. Andrews, E. Willys: *Chicago Med. Recorder*, August, 1895.

5. Judd, E. S.: *Jour. Minn. State Med. Assn.*, Feb. 15, 1908.

6. *Anatomy and Surgical Treatment of Hernia*, p. 346.

7. Ferguson, A. H.: *Ann. Surg.*, May, 1895.

8. Ferguson, A. H.: *Modern Operations for Hernia*, Cleveland Press, 1907, p. 282.

9. Connell, F. Gregory: *Radical Operation for the Cure of Hernia*, Surg., Gynec. and Obst., October, 1908, p. 431.

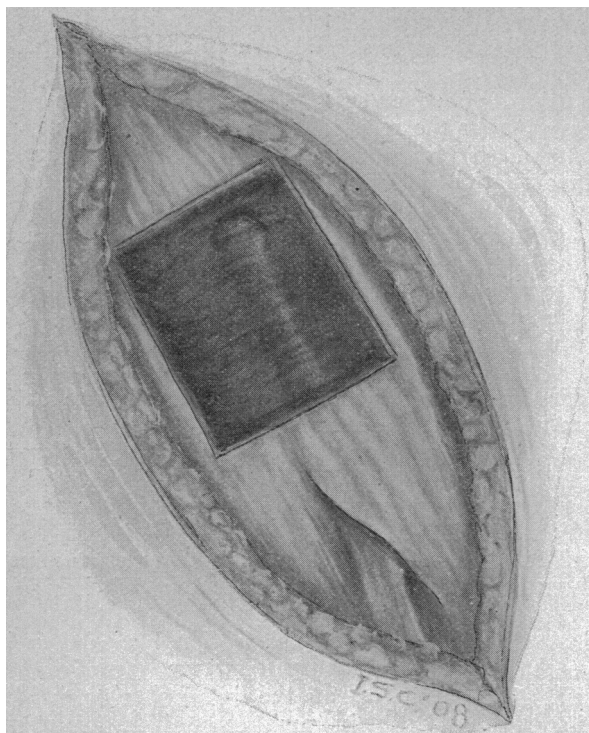


Fig. 1.—Front view, inguinal region. normal relations, showing, through an opening in aponeurosis of external oblique muscle, the size and position of the internal ring, lying behind the internal oblique muscle.

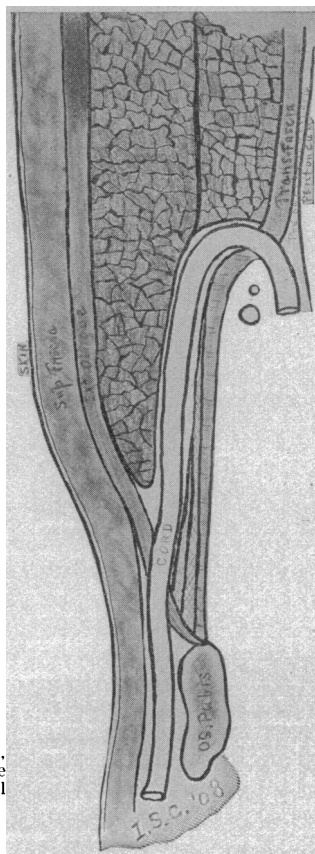


Fig. 2.—Sectional drawing of relations in Fig. 1, showing parietal peritoneum smooth; internal ring small and surrounding cord; internal oblique muscle covering internal ring; inguinal canal oblique, long, and narrow.

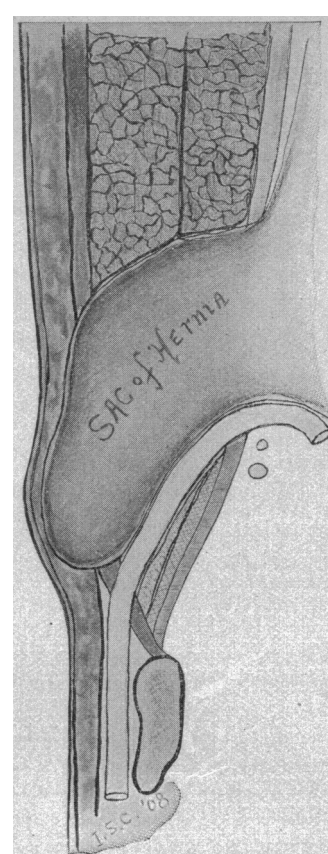


Fig. 4.—Sectional drawing of relations in Fig. 3, showing parietal peritoneum bulging outward forming sac; internal ring enlarged downward, surrounding cord and sac; internal oblique muscle elevated above the internal ring; inguinal canal less oblique, short and wide.

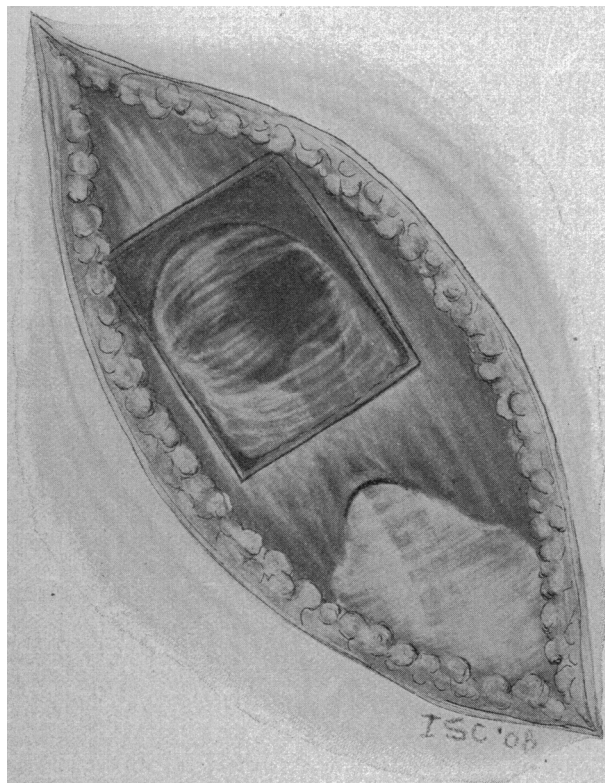


Fig. 3.—Front view, inguinal region, with oblique inguinal hernia, showing, through an opening in aponeurosis of external oblique muscle, elevation of internal oblique muscle; dilatation and descent of internal ring; with sac covering cord and presenting at dilated external ring.

Ferguson has so forcibly and ably impressed the importance of placing the internal oblique muscle external to the external ring, that the value of a small and normal internal ring has been comparatively overlooked.

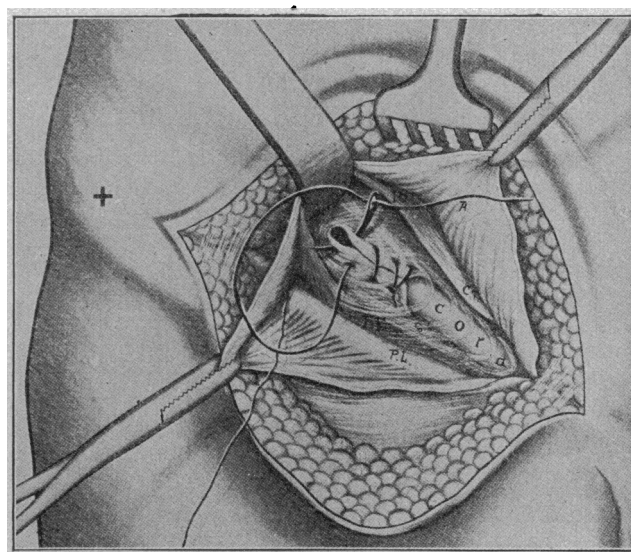


Fig. 5.—Repair of internal ring (from Ferguson).

These two factors are mutually beneficial; the higher the internal ring and the lower the internal oblique muscle, the more effectual will be the prevention of recurrence (Figs. 1 and 2).

The reason that the internal ring has not been elevated, as well as made smaller, by stitches placed be-

neath the cord, is the fear of a possible traumatism to the cord, which might cause interference with the nutrition and function of the testicle.

The question whether the transplantation of the cord is necessary in the radical cure of inguinal hernia, I have previously discussed.¹⁰

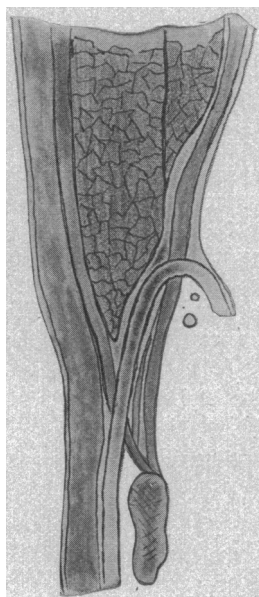


Fig. 6.—Sectional drawing of relations in Fig. 5, showing descent of internal ring.

Repair of the internal ring with a consequent elevation of the cord to its normal position can hardly be considered a transplantation of that structure.

In conclusion: I would emphasize the repair of the internal ring by suture of the transversalis fascia beneath the cord, which causes both minimization and elevation of that structure, with the attachment of the internal oblique muscle to the outer two-thirds of Poupart's ligament, so that it covers and protects the repaired internal ring. The above details cause a relationship which results in a valve-like formation of the inguinal canal, which is important in preventing recurrence. These steps should be preceded by the removal of the sac at its neck, with the redundant

parietal peritoneum, and followed by the reunion of the divided external oblique aponeurosis, and the formation of a suitable external ring.

THE MANAGEMENT AND TREATMENT OF A CASE OF INFECTION BY THE BACILLUS TYPHOSUS *

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In consideration of the prevalence and mortality rate of typhoid, as ordinarily treated, I desire to present a method of management in this infection which promises to reduce the mortality to a large extent.

The most constant objective symptom of infection is fever, and it has been considered the physician's duty to combat it at all hazards. The use of the coal-tar antipyretics, however, was followed by an increased mortality rate, while the Brand method, founded on the idea that fever should be lessened, if possible, does not, I believe, materially lower the mortality rate. A consideration of the complex of symptoms which we call fever leads me to believe the rise of temperature in fever to be, as Bunge says, "one of the processes of self-protection and regulation of which we have so many examples in the body." On the assumption that fever is a physiologic effort at self-defense, the physician can surely occupy himself with something better than attempts at dulling this valuable weapon.

A case of typhoid infection presents pre-eminently a picture of toxemia; the trembling tongue, the slow cerebration, the diarrhea with anorexia and insomnia,

all point to profound intoxication produced by the toxins set free by the disintegrating bacilli. If the individual lives, he will have established immunity to the bacillus in from three to five weeks. The physician at present possesses no drug or combination of drugs capable of destroying the bacteria or of hastening the immunizing process. Writers in current medical literature concern themselves chiefly with devising methods of lowering the temperature, but not a single writer, so far as I know, has suggested a plan for lessening the toxemia which is the sole cause of the patient's rise of temperature.

In my experience with the Brand method, in the absence of bath facilities, I had to resort to the application of bath towels saturated in water inversely proportionate to the temperature of the patient. The clearing up or non-appearance of delirium, the lessening of diarrhea and tympanites, and the improvement in sleep and digestion, really due to lessening of toxemia, I attributed at first to the antipyretic effects of the bath, which, however, seemed out of all proportion to the insignificant lowering of the temperature. But a series of cases in women and children, who refused the cold towelings, compelled me to compromise by warmer but more frequent baths. To my surprise, these patients did much better than those who had received the cold toweling. This led me to formulate a method of treatment that includes, first, the water supply necessary; second, a regular elimination of toxins, and, third, the food supply—these being, to my mind, the fundamentals of successful treatment of a patient with typhoid infection.

The method is briefly this: As soon as a diagnosis is made with reasonable certainty a calomel purge is given at bedtime and is followed with a saline cathartic next morning, not with the idea of modifying the infection, but for the purpose of clearing the intestinal tract of particles of undigested and fermented food, for during the prodromal period of the disease most of these patients eat food that they can not digest.

The baths are now instituted at once without reference to the patient's temperature. The bath is first given at 7 a. m. and repeated regularly every two hours during the day until 9 p. m., unless the patient is restless, when the last bath is given at 11 p. m. Immediately preceding each bath the patient is required to drink from four to eight ounces of water, and immediately after each bath he is required to sip slowly from two to six ounces of milk, the amount depending largely on the appetite of the patient.

TECHNIC OF THE BATH

One-half of the bed is covered with any material (an ordinary quilt, folded once, answers the purpose perfectly), the patient's nightgown is removed and he is moved on to the covered portion of the bed. Two large bath towels are then saturated in a bowl of water of the required temperature; the patient is told to extend the arms parallel with the body, and the anterior surface of the body is covered with the towels that have been slightly squeezed—not wrung—when taken from the water. The towels are allowed to remain for three minutes; then they are removed, rewetted, and the process is repeated on the posterior surface of the body. The patient's body should be entirely covered from head to heel, the towels overlapping somewhat in the middle of the body. The whole process, including time spent

10. Connell, F. Gregory: *Am. Jour. Med. Sc.*, March, 1905.

* Read before the Military Tract Medical Association, Oct. 15, 1908.