THE FREE TRANSPLANTATION OF FASCIA LATA
IN THE REPAIR OF VENTRAL AND INGUINAL HERNIE WITH CASES*

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The free transplantation of tissue from one part of the body to another part of the body for service is an accomplished fact and for some kinds of tissue it is so uniformly successful that a new chapter is being written into the surgery of our time. The success of the transplant does not depend so much on the complexity or the simplicity of the tissues which are transferred to new situations as it does on their blood supply. Tissues with an abundant blood supply are the most difficult to transplant with success, while tissues which are meagerly supplied with blood-vessels may be transplanted with the greatest assurance of success. Their demand for nourishment in their new home is more easily met by the lymph which oozes about them and into them, until new vessels and new connective tissue can grow to them and make them an integral part of the tissues in their new situation.

Fascia is such a tissue. It can be transplanted with almost uniform success. It is easier to transplant than bone and it is much more sure than the ordinary skin graft. In animals, I have transplanted fascia or tendons some forty-four times and have lost the transplant in only one animal, and that was due to an accidental sepsis.

It is not my purpose to report this series of experiments here. This paper is written to urge the use of transplanted fascia in the routine of practical surgical work, to add strength and to supply defects in ventral and inguinal hernie. Plastic flaps in these cases can do much, but often they can be greatly strengthened or can be replaced by a strong fascial transplant such as may easily be taken from the iliotibial band of the fascia lata.

The following case illustrates its successful use in a large ventral hernia:

A woman of forty-eight came into the City Hospital on the University Service, with a strangulated hernia the size of a small grape fruit, in the

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scar of an old abdominal incision. The strangulation had been present only a few hours and was reduced under gentle taxis without much difficulty. The symptoms subsided rapidly and she was watched carefully during the succeeding hours. As nothing developed she was allowed to remain in bed a few days to gain her physiological balance before an attempt to close the hernia was made. During the previous four years she had been operated upon three times, twice for abdominal lesions she did not understand and the third time for an unsuccessful closure of the rupture. Her scar reached from an inch and a half below the typhoid cartilage to about two inches above the symphysis, and the umbilicus had been removed. The inverted skin allowed a fist to be thrust through the hernial opening and the tissue was thin just above and below this opening.

At operation the main opening was found in the median line about four and a half inches long and three and a half inches wide with two small secondary herniae, one above and one below the main one (Fig. 1). These two smaller ruptures were easily closed by the method which has been found the most satisfactory in cases of umbilical herniae—that is, by an upper and a lower flap so managed that one flap of tough fibrous tissue is drawn under the other by mattress sutures and the other is made to overlap it like an apron, with a suture line along its margin.

When it came to the larger hernia, it was easily to be seen that it would be impossible to close the opening between the recti muscles by direct suture. The opening was so wide and the tension would be so great that any sutures would soon cut through. A plastic operation was at once undertaken. The rectus-sheaths were intact and the anterior layer ran smoothly around the muscle edge to join the posterior layer. This fact was utilized to turn a flap across the wide opening the full length of the hernia and to suture it along the edge of the rectus of the opposite side. This flap was cut the entire width of the rectus sheath and at one place included a portion of the external oblique also. A return flap was cut in the other rectus sheath and turned across and sutured into place, making a double thickness of rectus sheath to stop the opening. At the time this was thought to be sufficient. The skin was sutured and the patient returned to bed.

After the union had gone on to a good healing and we were about to let the patient go home, the hernial site still seemed a little thin to me and she accepted my proposal to strengthen it still further by a transplantation from the fascia lata. After dissecting back the skin and superficial fascia, the repair seemed much firmer than it had when examined from the outside but a strong transplant would certainly improve it. A seven-inch incision was made in the outer aspect of the thigh and two strips of the strong iliotibial band were taken, beginning just below the insertion of the vagina tensor femoris, where the fascia is strongest, three inches long and a little over two inches wide, one below the other. These were sutured side by side, transversely across the previous repair with the idea that the lines of force would act in the direction of their fibres by the natural pull of abdominal muscles under use when they had finally healed into place (Fig. 2). For we have found as the result of numerous experiments on animals, as others have found, that unless transplanted fascia
Fig. 1.—Repair of large ventral hernia by turning over first the flap of the external sheath of one rectus and then that of the other across the opening. The two small ones each repaired by drawing one flap of strong fibrous tissue up under the other, which was brought down over it like an apron, with a suture along its edge as in the usual peri-umbilical hernia.
FIG. 2.—The two free transplants of the iliotibial band of the fascia lata sutured transversely across the repair shown in Fig. 1.

FIG. 3.—Free transplant of iliotibial band of fascia lata inserted above the first line of sutures in a modified Bassini operation for the repair of an inguinal hernia with weak tissues. This is sutured snugly across the lower margin of the internal ring, then along Poupart’s ligament and well on to the sheath of the rectus and lies over the rectus sheath, the conjoined tendon and the internal oblique. The upper flap of the external oblique and the lower portion of the cord are omitted from the drawing for the sake of clearness.
Fig. 4.—Shows the lower flap of the external oblique sutured beneath the cord to add one more layer for the strength of the repair. It is drawn well over on to the rectus sheath to protect the second commonest point of recurrence opposite the external ring and sutured carefully across the lower margin of the internal ring to protect this place again, which is the greatest place of recurrence.

Fig. 5.—Shows the upper flap of the external oblique sutured over the cord to Poupart’s ligament to make a new canal for the cord.
FIG. 6.—Shows the fascial transplant adapted to the Ferguson operation. It is inserted over the internal oblique and the conjoined tendon and well on to the rectus sheath, beneath the lower flap of the external oblique. Great care is taken to suture both of them about the emerging cord. This is also true of the upper flap of the external oblique, which is not here shown, but which is sutured as in Fig. 5.
or transplanted tendons are kept on the stretch they shorten and become more or less replaced by ordinary connective tissue, but that when they are so fastened they preserve their structure and can sustain the strong pulls for which they are made. These transplants healed firmly into place and gave us a strong closure of our abdominal wall. The wound in the thigh healed by first intention with no loss of function in the leg and without any bulging of the muscles at rest or in use.

The use of fascial transplants in the repair of inguinal herniae with thin or defective tissues is a little more complicated because it must fit in with the technic of the operation, but these transplants heal into place readily and firmly. I feel that the method is of distinct advantage in gaining strong closures in some of our most difficult cases.

The following case illustrates the method I have used in adapting the transplant to the Bassini operation. A male patient, on the University Service of the City Hospital, had both a right inguinal and a right femoral hernia. Both ruptures were repaired through the same incision, the femoral hernia by suture of the pectineal fascia to the lower surface of Poupart's ligament in the usual way; in the inguinal hernia the arcuate fibres of the external ring were cut well toward the top of the ring and the aponeurosis of the external oblique was separated from this point in the direction of its fibres well out beyond the level of the internal ring, making a lower flap a little less than an inch in width. The sac was dissected, opened and ligated, and the cord raised in the usual way. The conjoined tendon and the internal oblique and transversalis muscles which run into it were all thin and gave promise of a poor result. The transversalis fascia and the cremaster were both thin and did not offer much additional support. The thin outer edge of the internal ring was gently rooted outward with the finger, until the first thin fibres gave way and the thick mass of muscle fibres arching across from Poupart's ligament just above it gave a firm upper edge for the new ring. A supporting stitch, as suggested by Coley, was inserted in this muscle just above the ring to draw it to Poupart's and another close below the cord to make a snug ring, after the cremaster had been drawn upward beneath the muscles and the conjoined tendon by mattress sutures after the method of Halsted.

The muscles and conjoined tendon were carefully sutured to Poupart's, as in the Bassini operation, but they were fastened to the lower part of the shelving portion of the ligament and the sutures were passed through the ligament so that the knots would lie on the outer aspect toward the thigh and not interfere in any way with the healing of the fascial transplant which was now removed, an inch and a quarter wide, from the iliotibial band in the outer aspect of the thigh and sutured (Fig. 3) along its lower border to the upper surface of the shelving portion of Poupart's ligament, with its outer end snugly up against the internal ring and its inner end reaching well on to the surface of the rectus sheath to near the midline of the body. The outer end was sutured snugly across the lower margin of the internal ring and upward to its top corner to
add material strength to the ring. The top border was sutured to the surface of the internal oblique and inward on to the rectus sheath and the inner end smoothly to the rectus sheath. In this way the two points of greatest recurrence, the one at the internal ring and the other opposite the external ring, were greatly strengthened as well as the entire suture line between.

The cord was now held upward and the lower flap of the external oblique aponeurosis (Fig. 4) was sutured snugly across the lower margin of the internal ring and upward to its top border, again strengthening this ring. The inner end of this flap, which was originally the margin of the external ring, was drawn inward well on to the rectus sheath and sutured smoothly into place, in this way strengthening the inner point of greatest recurrence as well as the entire suture line by an additional layer of strong tissue. The upper border of this flap was now sutured to the parts below, completing the suture of all the tissues which were to lie below the cord. The cord was now dropped into place and the lower edge of the upper flap of the aponeurosis of the external oblique, which had been somewhat loosened from the internal oblique, was now brought down over the cord and sutured to Poupart's to form a canal for the cord (Fig. 5). The inner end of the suture line was stopped at a point which would leave an easy opening for an external ring and the operation was completed by suture of the skin incision.

This patient healed by first intention throughout and when he was in condition to be up and about, the site of the inguinal repair felt firm, the tissues seemed thicker and more resistant than after the usual Bassini operation.

I have operated on two other inguinal herniae by this method in a patient who had a double rupture, one of which, at least, he had carried for over forty years. In his case the conjoined tendons and the muscles near them were so thin that there were spaces in them which were practically holes.

In adapting the transplant to the Ferguson operation for the radical cure of an inguinal hernia where the cord is dropped back and the internal oblique and transversalis muscles, together with the conjoined tendon, are sutured to Poupart's over the cord, the technic is more simple. The fascial transplant in this case can be sutured over the first layer of tissues, taking care to suture the inner end carefully about the emerging cord, and then over on to the sheath of the rectus (Figs. 5 and 6).

In conclusion I simply wish to say that the fact that transplanted fascia held on the stretch heals into place and preserves its structure and its strength in its new situation, has been abundantly proven, as well as the fact that we may probably count on a living transplant in every case of ordinary surgical first intention.