

THE AMERICAN JOURNAL OF OBSTETRICS

AND

DISEASES OF WOMEN AND CHILDREN.

VOL. LXXVII.

JUNE, 1918.

NO. 6

ORIGINAL COMMUNICATIONS.

A NEW OPERATION FOR URINARY INCONTINENCE IN WOMEN BY TRANSPOSING THE LEVATOR ANI MUSCLE.

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(With seven illustrations.)

THE relief of urinary incontinence in women where the sphincter urethræ muscle has been destroyed by disease or the traumatism of childbirth, is one of the most difficult problems in surgery. Various procedures have been recommended in the past. One of these consists of taking a series of purse-string sutures in that portion of the detrusor muscle nearest the urethral orifice to form a new sphincter. This will undoubtedly help to a certain degree in many cases, but where the injury has been of long standing and considerable atrophy has occurred, the results are usually unsatisfactory. In these cases an attempt to use the remnants of the trigonal fascia together with the formation of a new urethra from vaginal or labial tissue has been performed. A urethra constructed by this difficult, and usually only partially successful operation, acts oftentimes merely like the spout to a kettle without materially improving the retention of urine in the erect posture.

It was a case of this kind which had in the course of seven years been subjected to five operations by two of the ablest gynecological surgeons of the East that induced me to attempt a procedure which so far as I have read the literature here and abroad, has not been previously suggested and which met with such a considerable degree of success that I feel justified in recommending it to others for trial in similar cases.

The occasion for this new procedure was the necessity of finding some muscle tissue that could be utilized for the purposes of a new

sphincter urethræ. It occurred to me that with a somewhat relaxed pelvic floor the anterior bundles of the levator ani muscle could be utilized for this object by transposing this portion of the muscle beneath the anterior vaginal wall and attaching it under the urethral opening to the pubic ramus of the opposite side.

Following is the history of the case:

Mrs. B., thirty-seven years old, consulted me for the first time on October 1, 1913. Her trouble dated back to the delivery of her first child in 1907. Apparently it was a brow presentation and a very difficult high-forceps application resulted in a fracture of the child's jaw. In the extraction of the head, the denuded jawbone of the child ripped open the entire urethra to the bladder. The mother made a fairly good recovery. Six weeks later she was taken to a surgeon in Philadelphia who attempted to form a new urethra from a portion of the left labium minus. This and two further operations done in the course of the two following months were failures so that there was complete incontinence both night and day. In the following year the patient gave birth to a full-term child without complication. At this time there was a hole in the bladder large enough to insert the tip of the index-finger. In 1910 she was again operated on by a Baltimore surgeon. The opening in the bladder was greatly decreased in size by circular sutures enveloping the edges of the detrusor and a urethral plastic from the surrounding vaginal tissues supplemented this. Bladder drainage was secured through a vesicovaginal incision. This operation resulted in a slight improvement in urinary control at night but during the day the incontinence was complete. The following year the same surgeon proceeded in the hope that a uterine suspension would relieve the pressure on the bladder and so diminish the incontinence. This operation, however, proved to be useless.

Two years later in 1913 she consulted me. I found a woman in good general physical condition with no marked abnormalities except the local condition. The constant dribbling of urine had caused pronounced chafing of the entire vulva and the inner aspect of both thighs. The vulva showed a defect in the left labium minus from a previous operation, a markedly relaxed pelvic floor, cystocele and rectocele, and an opening into the bladder about 1 cm. in diameter with a small fistulous tract to the left and below it. Two centimeters above this opening was a small pocket representing the former urethral opening. The uterus again lay retroverted, but only partially descended owing to peritoneal adhesions. Adnexa seemed normal.

Owing to external factors the patient could not come up for operation until Sept. 27, 1915. Conditions had not changed materially during the course of these two years. The operation done under ether anesthesia may be described in the following steps, corresponding to the illustrations:

Step 1.—A U-shaped incision was made surrounding the urethra and extending about 3 cm. above and below it. A semicircular incision was also made at the junction of perineum and vagina extending somewhat higher on the right side.

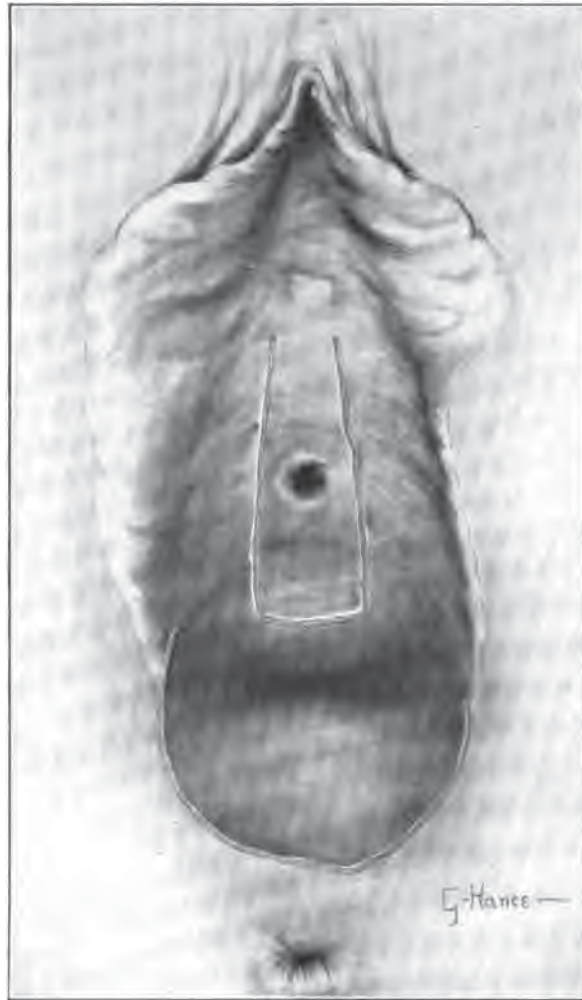


FIG. 1. *Step 1.*—Primary incisions. U-shaped incision around urethra. Pocket of old urethral opening above incision. Incision along perineum.

Step 2.—The vaginal mucosa below the urethra was dissected off to form a flap and the vagina dissected off for some distance to either side to lay bare the peri-urethral tissue. At the same

time the levator ani muscle was laid bare through the perineal incision. On the right side it was exposed along its entire length. Then grasping a bundle of muscle $1\frac{1}{2}$ cm. in width, it was cut free from its rectal attachments and dissected loose from the main muscle

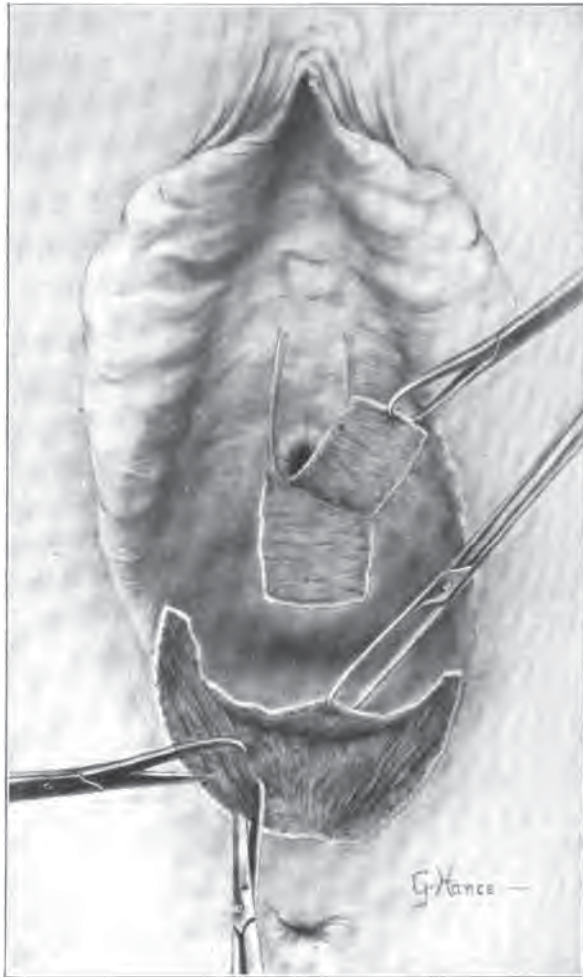


FIG. 2. *Step 2.*—Dissection of flap for new urethra. Cutting attachment to rectum of anterior bundle of levator muscle.

bundle so that a muscular flap about 6 to 7 cm. in length was formed, still attached to its insertion in the white line. This caused but little bleeding.

Step 3.—The vaginal wall between the urethral incision and the perineal incision on the right side was then tunneled loose and a curved forceps passed from the urethral incision through this tunnel

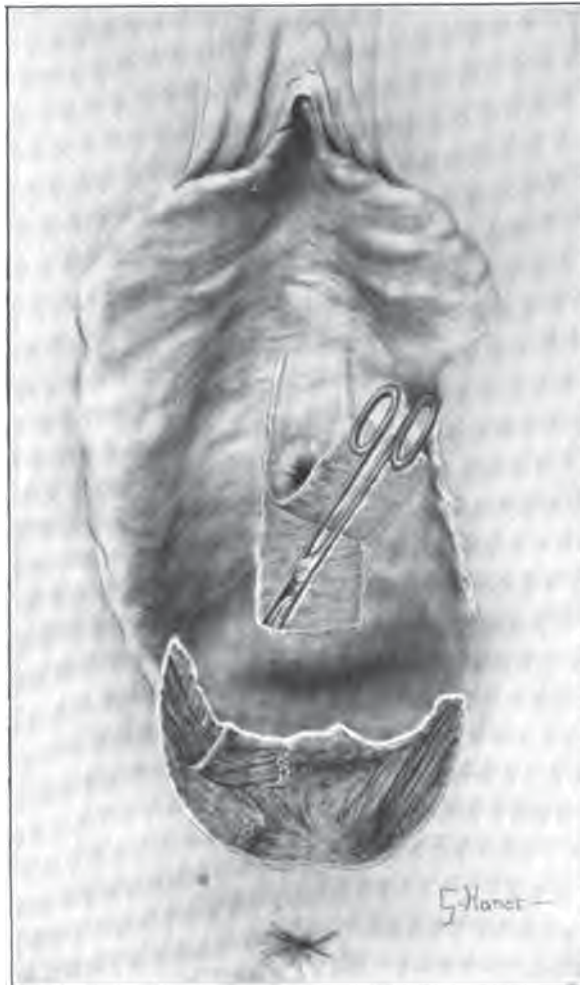


FIG. 3. *Step 3.*—Tenaculum forceps passed from urethral incision under vaginal wall to catch the loosened bundle of levator muscle and pull it through to the urethra.

to grasp the bundle of levator muscle fibers and pull it through to the urethra.

Step 4.—Three No. 1 thirty-day chronic catgut sutures attached

the ends of the transposed muscle to the remnants of the trigonal fascia on the left side and the edge of the muscle was similarly attached by a suture on the right side.

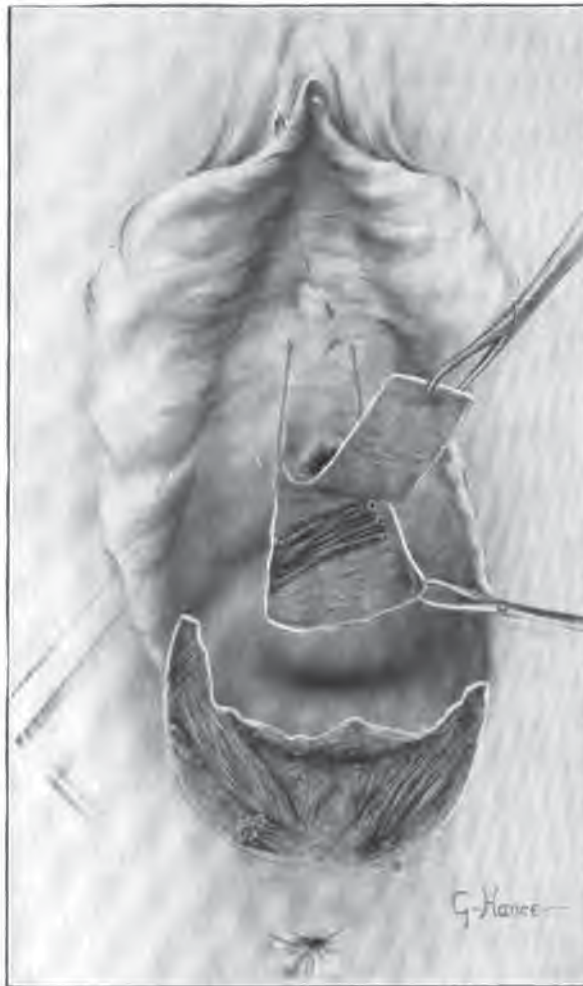


FIG. 4. *Step 4.*—Suturing the transposed muscle beneath the urethra to the left pubic fascia and to the tissues on the right side.

Step 5.—The vaginal flap below the urethra was sutured to the inner edge of the U-shaped incision forming a urethral canal 3 cm. long and the outer edges of the incision sutured over it to close the

wound area and cover the urethral canal. A small retention catheter was left in the urethra and fastened by a silk suture.

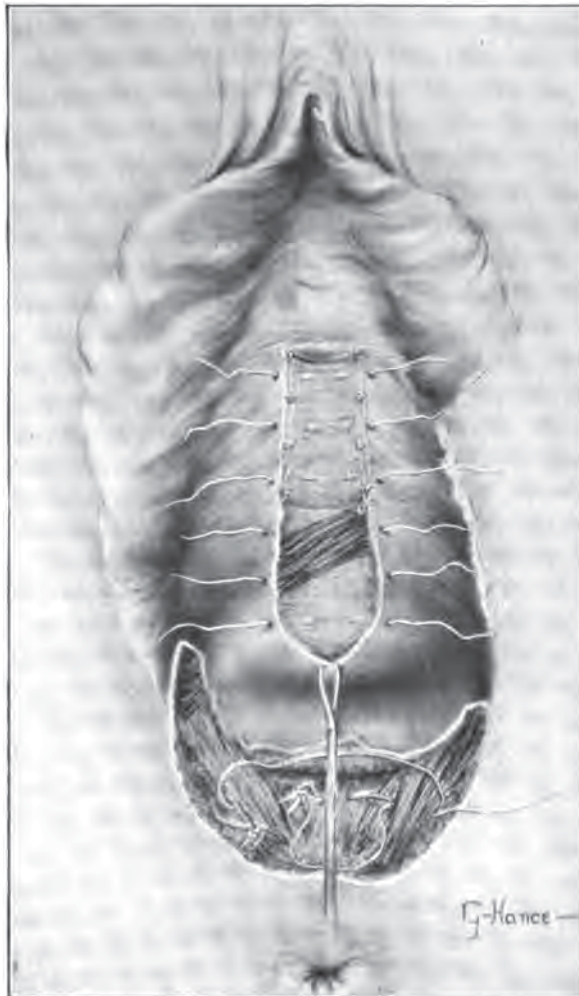


FIG. 5. *Steps 5 and 6.*—Vaginal flap has been fastened forward to form a new urethral canal. Sutures in place to cover this canal with the surrounding vaginal wall. Below can be seen the figure-of-eight suture to approximate the levator ani muscle on the left side to the remaining portion of the muscle on the right side.

Step 6.—The levator muscle on the left side which had been torn and was in consequence somewhat reduced in size was now sutured

to the remainder of the levator muscle on the right side and the perineal wound closed in layers in the usual manner with catgut sutures.

The postoperative course was complicated on the third day by a rise of temperature to 101.5° F. and general malaise. The temperature remaining high on the next day, the wound was inspected. In so doing some traction was exerted on the urethral sutures which probably interfered somewhat with primary union. The wound area, however, looked clean, so a careful blood examination was made. This showed numerous malarial plasmodia with a few crescents. Under anti-malarial treatment the fever subsided and the patient made a good recovery. When the retention catheter was removed on the eighth day the patient was able to hold all but a small portion of the urine in the recumbent posture. On getting up, however, the urinary control was less satisfactory, about 2 to 5 ounces being voided with a leakage of 1 or 2 ounces in the interval. Inspection of the wound one month after operation when the patient left for her home, showed that the perineoplastic had healed very well. About 1 cm. of the urethral canal had held and beneath this lay a firm muscle bundle the thickness of an index-finger.

On April 20, 1916, seven months later, the patient's husband, who is a physician, reported that she voided usually once at night with very little incontinence except just on getting up on the commode. She voided from 8 to 10 ounces at night and about 4 to 6 ounces at a time during the day. Not more than six napkins a day had to be changed. The condition was at least 50 per cent. better than before. An interesting observation was that if the patient was traveling on a train, the retention of urine was almost perfect and was associated as usual with constipation. On the other hand, if the patient was nervously exhausted, or having her menstrual period, the leakage of urine was more pronounced.

We tried various forms of pessary to exert pressure on the urethra but these failed to give relief. Finally a secondary operation was decided on. The patient returned to town and on Oct. 15, 1917, two years after my first transposition operation, the secondary plastic was performed. At this time the transposed levator bundle was still distinctly outlined and a contraction could be felt synchronous to the contraction of the main levator muscle. Retraction of the perineum pulling upon the muscle produced a partial leakage of urine. The second operation consisted essentially of three steps:

Step 1.—Large U-shaped incision extending 6 cm. above the urethra to the upper margin of the labia minora,

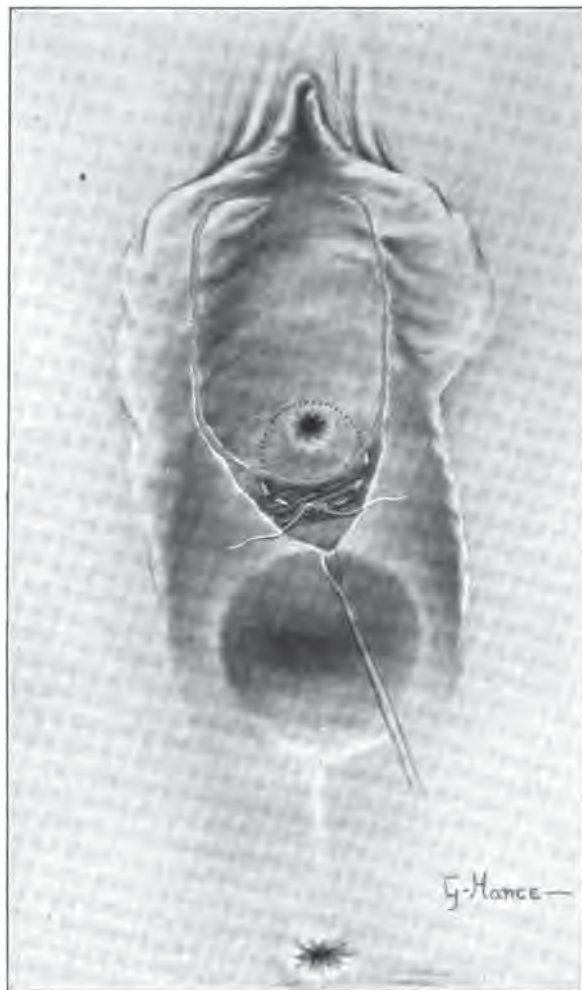


FIG. 6. *Second Operation. Steps 1 and 2.*—Large U-shaped incision outlining the flap for the new urethra. First purse-string suture passed around the urethra and beneath the mucosa emerging beneath to pick up the transposed muscle bundle and bring it in a crescentic form firmly around the urethra.

Step 2.—Exposure of the transposed muscle. Two purse-string sutures passed around the urethra picking up laterally the edges of the muscle and thus bringing the muscle up and around the

urethra in a crescentic form. These sutures were tied over a metal catheter fairly snugly. No. 2 forty-day chromic catgut was used for this purpose.

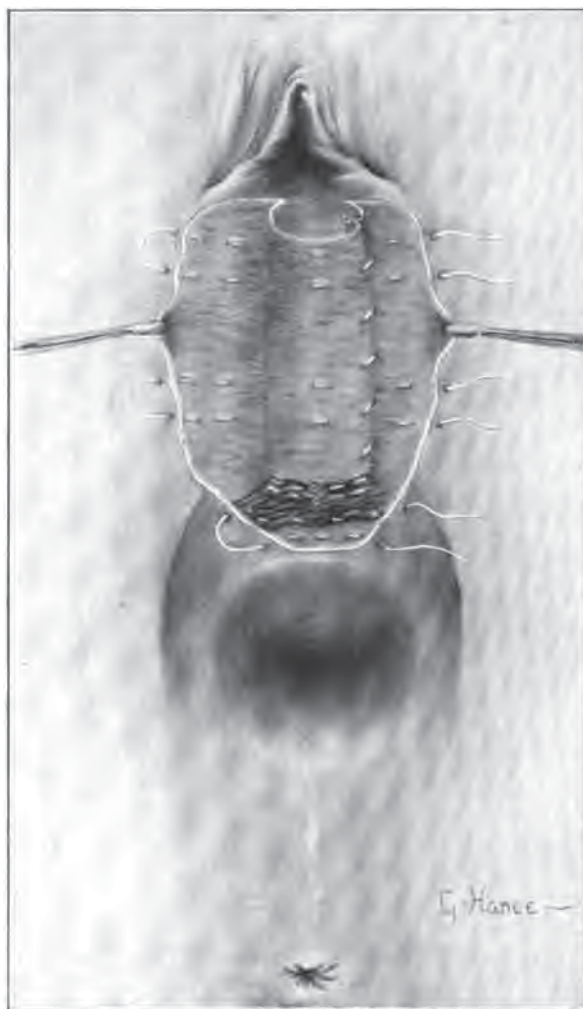


FIG. 7. *Second Operation. Step 3.*—Sutures encircling urethra have been tied. Inner canal of new urethra formed by labia minora closed by interrupted mattress sutures. Mattress sutures in place approximating the edges of the labia majora over the urethral canal.

Step 3.—A new urethra 6 cm. long was built up from the inner layers of the labia minora employing more of the tissue of the right

labium which was still intact. The remainder of the labia minora was trimmed off and the wound and new urethral canal covered up by drawing together with sutures the tissues at the junction of labia minora and majora.

An important feature of the urethral plastic was the employment throughout of a mattress suture bringing together raw surfaces instead of only the edges of the tissues. Again a retention catheter was fastened in place through the new urethra.

When the bladder was being tested at the conclusion of the operation by filling it with boric acid, a most unpleasant accident occurred. The boric solution was found to be coming in considerable quantity from the vagina. Inspection, made with some difficulty, showed that the old vesicovaginal drainage fistula made in the operation seven years previously in Baltimore not far from the cervix had again opened up under the tension of a full bladder. A lateral perineal incision, exposure of the fistula and two catgut sutures placed after denudation fortunately resulted in a closure of this fistula without further trouble.

The postoperative course this time was very satisfactory. Primary wound healing was obtained. The new urethra remained about 6 to 7 cm. in length with the new meatus just below the clitoris. Only a slight degree of incontinence on exertion or walking around was experienced. She now has perfect control at night and uses only about two cloths during the day when she is around a great deal. The anatomical result is almost perfect and it seems probable that with electrical stimulation to the new sphincter the functional result may also return entirely to the normal.

In conclusion I hope others may be induced by this success to employ the procedure in similar cases. I would suggest, however, that, if possible, a levator muscle flap be dissected off from both sides and brought together in the midline beneath the urethra, since thereby the muscle could in the first instance be made almost to surround the opening instead of merely exerting pressure against it.