

meatus. These should always be cut upon the floor of the urethra to an extent sufficient to cut through *all* the morbid fibrous thickening which constitutes the stricture. (See Meatotomy.)

Civiale's Urethrotome.—This instrument (Fig. 51), of which there are many modifications, is used almost exclusively by Thompson and others for cutting permeable strictures of the anterior urethra.

It has a small, straight shaft terminated by a flattened bulb which conceals a rounded blade. By means of a mechanism in the handle this blade may be protruded to an extent indicated upon a register in the handle. The bulb is to be passed through a given stricture, withdrawn until it encounters the stricture, when the blade is to be protruded, and the stricture is cut by withdrawing the instrument. It is a very safe urethrotome. It is most serviceable for cutting a single linear, well-defined stricture of the pendulous urethra.



FIG. 51.

Maisonneuve's Urethrotome.—

This instrument (Fig. 52), or one of its modifications, is used by those who perform internal urethrotomy on strictures of the bulbo-membranous urethra.¹ It is, moreover, the only urethrotome that will cut a stricture which only admits a filiform bougie. It consists of a hollow wire with a linear opening on the side corresponding to the roof of the urethra. The knife (of different sizes), cutting from before backward, and from behind forward, with its exposed obtuse angle always blunted, is attached to the end of a long stylet which fits into the groove of the instrument. The blade is prevented from slipping out by a projecting shoulder on each side which runs inside the hollow wire. It is used with a screw-tipped filiform bougie. Bumstead has advantageously modified the original instrument by making the knife run only to the beginning

¹ This is the practice of most continental surgeons, but in this country external urethrotomy is preferred for these cases.

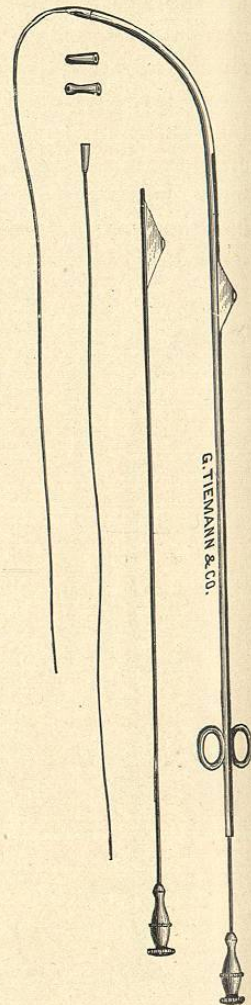


FIG. 52.—BUMSTEAD'S MAISONNEUVE URETHROTOME.

of the curve, instead of up to the point, and by making the tube a little more solid. Bumstead's instrument has the blade on the lower side, and therefore is not appropriate for strictures of the pendulous urethra, since these should always be cut on the roof. Other varieties of the Maisonneuve instrument do this.

The instrument is introduced, following its guide, and depressed until the straight portion of the tube has passed the stricture. Then the blade is entered, pushed rapidly down as far as it will go, and immediately retracted. The objection to the instrument is that it incises the urethra blindly and throughout its length if a large blade is used, while it may fail to divide the whole thickness of the stricture if a smaller blade is selected. Another objection—that the soft woven filiform is liable to curl up in front of the stricture instead of engaging—is overcome by the use of a stiff woven filiform or of a whalebone bougie threaded as for the tunnelled sound.

Otis's Dilating Urethrotome.—This powerful instrument (Fig. 53) is a very valuable one for cutting strictures in the pendulous urethra. It has a straight, oval shaft, about size 20 (a smaller and correspondingly lighter instrument is made, but the stiffer one is the better). The end of the shaft is tunnelled for the passage of a whalebone guide. The two segments of the shaft are separated by turning the screw in the handle, the extent of separation being registered upon a plate on the handle. The limit of this separation is 45 French. The knife is narrow, concealed in the shaft at a point near the end of the instrument. It is disclosed by withdrawal, when it rides upon a ridge which is continuous up to the handle. The instrument is introduced until the point of emergence of the knife is about $\frac{1}{2}$ inch behind the deepest stricture to be cut. The blades are then separated until the stricture is well upon the stretch. The knife is withdrawn, cutting the tense tissues. The instrument may then be still further screwed up if desired, and the cutting continued to any extent upon the roof of the urethra. The whole roof or a part of it may be cut. The knife is then returned, the instrument unscrewed and withdrawn.

The Choice of Instruments.—The Otis urethrotome is the instrument generally used in this country, and the preference is justified

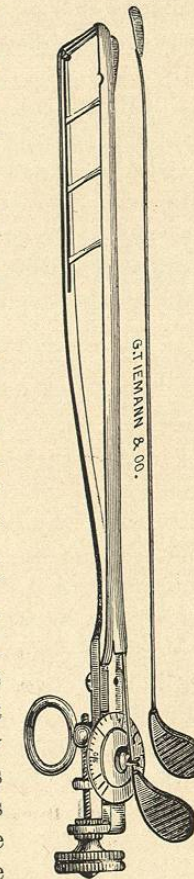


FIG. 53.

by the facts in all cases of stricture of the pendulous urethra. At and beyond the bulb external perineal urethrotomy is called for. The Otis instrument has the advantage over the Maisonneuve of cutting the stricture from behind forward intelligently, and cutting nothing but the stricture. It has the advantage over the Civiale of cutting the whole stricture in a single stroke, or at most in two strokes, whereas with the bulbous instrument this is not always possible.

INTERNAL URETHROTOMY

Preparation.—As preparation the patient should take $\frac{1}{2}$ to 1 gramme of urotropin 3 times a day for two days beforehand. If cocain is used, the urethra should be distended with a 2% solution of the drug for five minutes before the operation. If general anesthesia is employed, the customary catharsis is appropriate. For local preparation the urethra and bladder should be thoroughly irrigated immediately before the operation (a small catheter will usually pass), while if there is any marked inflammation, it should be reduced as far as possible as a preliminary measure.

The Operation.—The operation should be conducted according to certain rules—viz.:

1. All incisions, except those at or near the meatus, should be made upon the roof of the urethra. The reason for this is that there is usually less scar to cut through in the roof than elsewhere, and there is also less tendency to inflammation and infiltration, since the incision, after dividing the corpus spongiosum, enters the intercavernous septum and not the subcutaneous tissue.

2. The operation should be completed by one cut, if possible, or at most by two, and the stricture should be cut at least three sizes (French) larger than the normal (p. 170) meatus.

3. No instrument should be introduced into the posterior urethra either during or for two weeks after the operation. If this rule is observed no urethral chill or other infectious complication need be feared after section of any stricture in the penile urethra.

4. If the hemorrhage is alarming, and not to be checked by finger pressure, it may be controlled by the injection of a saturated solution of desiccated suprarenal capsule (after which secondary hemorrhage may occur), or by bandaging the penis after introducing a medium-sized woven catheter into the anterior urethra, or by binding the penile urethra tightly between two narrow strips of wood laid like splints along the dorsum and the venter of the penis.

After-treatment.—The patient should usually remain in bed until the third day. The urotropin is continued, and on the second day a

full-sized sound is passed through the stricture, but not into the posterior urethra. This operation is quite painful and may excite as much hemorrhage as the operation itself. The next day, if all is well, the patient gets up, unless a cystitis, a fever, or any other complication makes his stay in bed advisable. The same sound, or one a size or two smaller (if there is much congestion), is introduced on the fourth, sixth, tenth, and fourteenth days. After this the full-sized sound is introduced twice a week as long as there is any tendency to contraction or bleeding. Sometimes two or three sizes are lost at first, but, in the end, the urethra should take a sound one size smaller than that to which it was cut. If the stricture continues to contract in spite of sounds, it must be cut again and to a larger size than before.

After the stricture is conquered the sound should be passed twice at intervals of ten days, twice at intervals of a month, and twice at intervals of six months. Any recontraction is appropriately treated by sounds (p. 220), and if at the end of this period there is no sign of recontraction, and the stricture was at or anterior to the peno-scrotal angle, the patient may be pronounced cured. If the stricture is deeper, the permanence of the relief must be proved by annual soundings for five years before the cure is assured (and this it very rarely is).

EXTERNAL URETHROTOMY

The Instruments.—1. A staff, tunnelled (Fig. 54), a tunnelled catheter or a Wheelhouse staff (Fig. 55).

2. A blunt probe-pointed bistoury, or a Blizzard knife (Fig. 56).

3. A female catheter.

4. A gorget or grooved director (Fig. 57).

5. A soft-rubber perineal tube with terminal and lateral eyes (size 32 to 40 French) (Fig. 58).

6. A large syringe or an irrigator.

7. Several sounds.

8. Clover's crutch (Fig. 59) or Pritchett's anklets and wristlets.

9. Scalpels, clamps, retractors, catgut and silk, probes, etc.

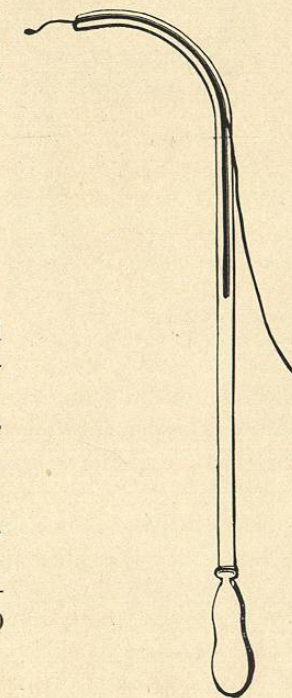


FIG. 54.

The Choice of Instruments is, to a great extent, a matter of taste. Some surgeons insist upon a Blizard knife, but an ordinary straight blunt-pointed bistoury serves as well. Again, a tunnelled staff will do for all purposes, although a blunt instrument or a Wheelhouse

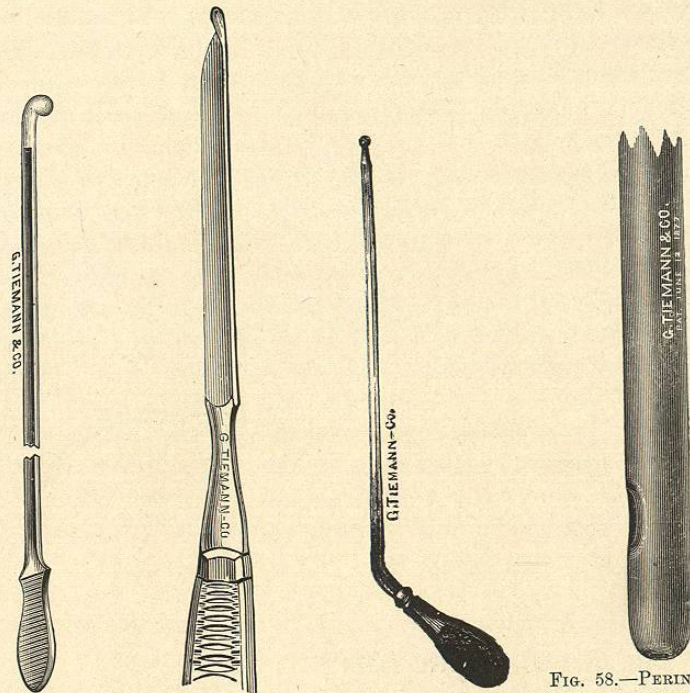


FIG. 55.—WHEELHOUSE STAFF.

FIG. 56.—BLIZARD KNIFE.

FIG. 57.—GORGET.

FIG. 58.—PERINEAL TUBE WITH TERMINAL AND LATERAL EYES.

staff is rather more convenient for urethrotomy without a guide. Some surgeons prefer to terminate the operation by inserting a urethral catheter *à demeure*; but the large perineal tube is far safer.

Preparation.—The patient is prepared as for any major surgical operation. Unless there is an immediate emergency, it is well to put him on urotropin, 1 to 2 grammes a day, for two days. The perineum is to be shaved and prepared antiseptically.

Anesthesia.—Local anesthesia may be employed by injecting a 5% solution of cocain into the urethra and infiltrating the tissues with a 1% solution. My personal preference is for general anesthesia, although, when the operation is done without a guide and the opening of the stricture is hard to find, the patient, if only anesthetized locally, may pass a few drops of urine, and so indicate the passage.

The Operation.—After the anesthetic has been administered every effort should be made to engage at least a filiform bougie in the stricture. If this succeeds, the operation, *external urethrotomy*

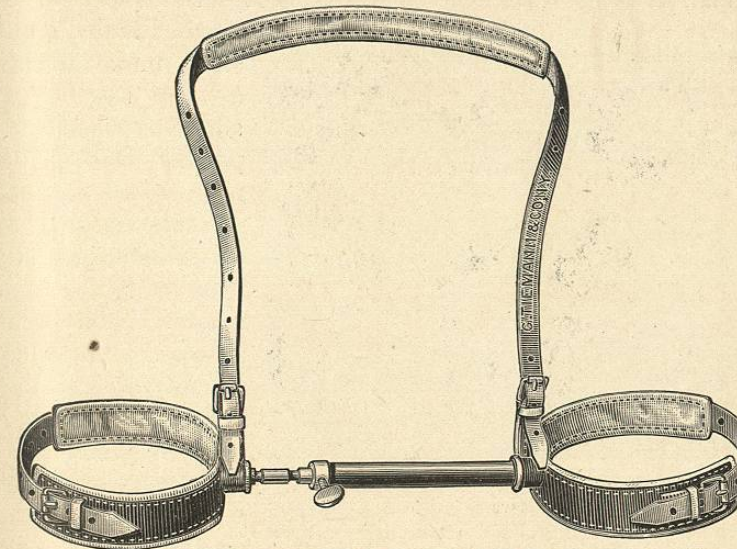


FIG. 59.—CLOVER'S CRUTCH TO HOLD THE LEGS, WITH STRAP TO GO OVER THE SHOULDERS.

with a guide, is perfectly simple. The bougie is carefully held in place, the patient put in the lithotomy position, and the tunnelled staff threaded over the filiform down to the face of the stricture.¹ One assistant occupies himself solely with holding the scrotum well up out of the way and keeping the staff directly in the median line and pushed outward in the perineum to form a resistance for the surgeon's knife. The surgeon seats himself on a low stool facing the perineum, and makes in it an incision 1 inch long down to the staff (A-B, Fig. 60). As soon as the tip of the staff is laid bare it is withdrawn a little, and the filiform is seen disappearing among the tissues. By following this a grooved director is readily introduced into the bladder, and, by running a blunt bistoury along it, the floor of the urethra may be freely incised without damaging the adjacent tissues. The director should not be removed until the index finger has been passed into the bladder. If there is contracture of the bladder neck this is to be broken, cut, or burned through (p. 317).

¹ The patient may be conveniently held in the lithotomy position by two assistants, or by the Clover's crutch (Fig. 59), or by a bandage tied at each end just below the patient's knees and slung around his neck, over one shoulder and under the other, or by Pritchett's anklets.

Having thus opened a way into the bladder, all instruments are withdrawn and all fibrous bands in the *roof of the urethra* must be cut with the knife, and any fibrous material detected in the floor of the canal, at either extremity of the incision, should be freely excised.

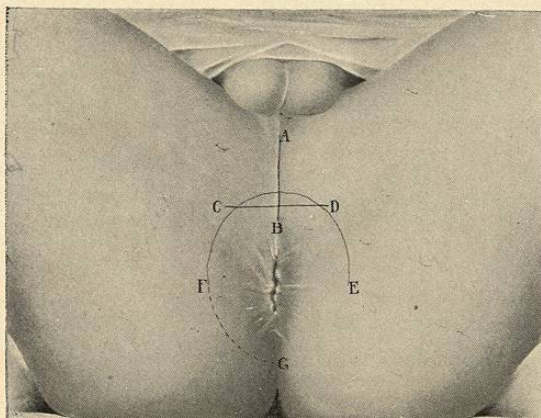


FIG. 60.—PERINEAL INCISIONS.

A-B, median incision; C-D, transverse incision; E-F, curved pre-rectal incision; E-F-G, incision for extirpation of the right seminal vesicle.

Finally, a blunt steel sound, as large as the urethra will admit, should be passed through the meatus into the bladder, the meatus and any anterior strictures being cut if necessary. This sound should be introduced several times, to make certain that it glides easily and without obstruction. If the stricture is an old one, it is always well to search the bladder for stone after the operation, and to remove any that may be found.

To close the operation the large perineal tube is inserted and the bladder washed free of clots with boric-acid solution. It is then filled once with nitrate of silver (1:4,000) to check hemorrhage and prevent chill. The tube is so placed that its eye is just within the bladder, and is pierced by a silk suture to mark the point where it emerges through the incision. Hemorrhage is sometimes considerable, but is readily controlled by packing about the tube. The tube is secured by two tapes passing X-wise over each groin and gluteal fold to a bandage belt. Over these a few pads of gauze are slipped about the tube and held in place by a T-bandage, split to pass up on each side of the scrotum. It is not advisable to use any sutures, since the patient's safety may depend upon free drainage, and healing is not materially hastened by sutures. The scrotum should be slung up out of the way to prevent infiltration of its loose tissues by blood and urine.

Without a Guide.—The operation just described—external urethrotomy with a guide—is simple and straightforward; but the same operation without a guide may still be accounted one of the most difficult operations known to the surgeon. Hence no effort should be

spared, either before or after anesthesia, to insinuate an instrument through the stricture. This failing, the operation without a guide must be undertaken. A large staff is passed into the urethra, and if any filiform is thought to have engaged ever so little it is left in place. The surgeon then cuts down upon the staff and lays the urethra freely open at this point. Much time may be saved if the surgeon—as soon as he has made this linear section of the urethral floor—inserts a stout silk suture into each side of the cut urethra and the adjacent tissues as near the stricture as possible. The ends of the ligatures are then knotted, and they make the best possible retractors and serve to identify the urethra, which otherwise may be hopelessly lost (Fig. 61).

Now the tedious part of the operation—the hunt for the opening of the stricture—begins. *The only guide is the roof of the urethra*, which should never be cut until the stricture has been laid open. Patient methodical searching usually ends in the discovery of this point, but wild or hasty jabbing is almost sure to fail. The two sutures mark the lateral walls of the urethra. Between them is the roof. Follow it back to where it is lost in cicatricial tissue and there is the opening. It is not plainly visible, but gentle sponging and probing may be depended upon to find it. As long as these bearings are kept in mind fifteen minutes is not too long a time to spend in finding the orifice.

Failing in this, three courses are open to the surgeon:

1. To cut directly back through the scar tissue until the urethra is opened.

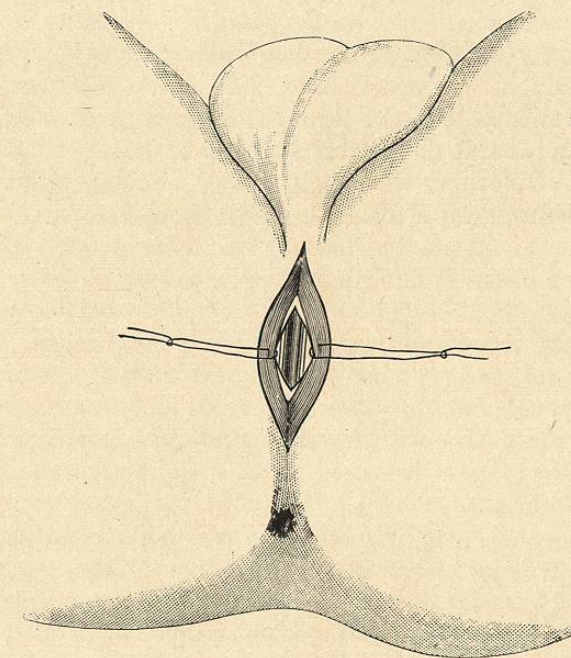


FIG. 61.—THE OPERATION OF EXTERNAL PERINEAL URETHROTOMY. Grooved staff seen between separated borders of incisions.

2. To search behind the scar tissue for the dilated portion of the urethra.

3. To perform retrograde catheterization.

The first course is usually selected, yet, although the chances of its success are great, it generally results in the destruction of an inch or two of the urethra. A safer plan is to feel for the membranous urethra by a finger in the rectum. This portion of the urethra lies in the median line between the prostate and the anus. Having identified it, the surgeon makes a clean incision from the last recognizable part of the urethral roof downward (as the patient lies upon his back) until he opens into the membranous urethra. If these landmarks cannot be made out, it is better to do retrograde catheterization at once. A further precaution to be borne in mind is to cut only in the median line, and not to cut too deeply. The natural tendency is to cut through the canal and to search for the opening up towards the prevesical space.

If at any time the probe or director is thought to have entered the urethra, a female catheter should be passed alongside of it, and as this enters the bladder the urine flows. The operation is then completed as described above.

The Wheelhouse Staff (Fig. 55).—This instrument is for use only in external urethrotomy without a guide. It is inserted, groove down, and cut upon like any other staff. As soon as the urethra is opened, the staff is revolved until its bulb presents in the wound, and withdrawn until it catches in the anterior angle of the urethral incision. It is then used as a central retractor. I have not found it essential.

Retrograde Catheterization.—This operation is the last resource when the stricture cannot be opened through the perineum. The legs are let down and suprapubic cystotomy is performed (p. 459). Through this wound a sound is introduced into the urethra down to the posterior face of the stricture. Upon this the urethra is readily opened. Most urinary surgeons in this country pride themselves never to have performed retrograde catheterization; but in Europe, where external urethrotomy is less often done, retrograde catheterization seems to be resorted to quite frequently.

After-treatment.—The patient is placed in bed with hot bottles about him and stimulated as much as necessary. To the perineal tube is attached a long rubber tube leading into a bottle containing a known quantity of 2% carbolic-acid solution. This is emptied from time to time, and the amount of urine accurately noted. The tube remains in place four days, during which time the bladder is injected through the tube once or twice daily with boric-acid solution.

If cystitis is severe 1:8,000 nitrate-of-silver solution serves better. The dressings are changed as often as necessary.

On the fourth day the tube is removed, a full-sized sound introduced, and a few drops of 1:1,500 nitrate-of-silver solution injected along the urethra. This is repeated twice a week until the wound is healed, and then at longer intervals (p. 218).

After the removal of the perineal tube the wound is kept clean and covered with a pad. For the first few days there is incontinence, and all or nearly all the urine is passed through the perineum. But the incontinence ceases, and the urine comes to pass entirely through the penis during the second or third week. Ten days later the wound is healed.

Complications.—Hemorrhage, spasm, and infection are the three complications to be feared.

Hemorrhage usually does no harm beyond blocking the tube or filling the bladder with clots, thus exciting spasm. But I have known a man to bleed persistently from a perineal wound until his death was imminent. Alum injections stopped the flow after other astringents and packing had failed. The bleeding is usually free for the first day, after which it decreases rapidly.

Spasm of the bladder is excited by distention of the organ with clots or by obstruction or slipping of the tube. The spasm may also be set up by the mere presence of the tube or of packing in the perineal wound. Clots may be removed by repeated gentle injections and aspirations of hot boric-acid solution, or by replacing the tube with a litholapaxy tube and aspirator. The injection of hydrogen peroxid may do more harm than good. On the other hand, if the spasm is due to the mere presence of the tube, the patient should be kept under the influence of narcotics for the first twenty-four hours, and if spasm persists at the end of that time the tube must be replaced with a smaller one or removed entirely. In the latter event the frequent use of the catheter may be required.

Infection is the great danger. It may assume any of the forms of urethral or urinary fever. Our great safeguards are diluent waters and urotropin by the mouth, nitrate of silver locally, and the perineal tube. If the integrity of the kidneys is assured no septic complications need be feared. Unfortunately, the kidneys are often congested, or even infected, and the mere cutting may suffice to excite a urethral chill, in spite of the most minute precautions; but this chill will not recur if there is efficient drainage and the patient is flooded with water by mouth or rectum (p. 46).

To recapitulate: The points in external urethrotomy that require special attention are: