Remarks on strictures of the urethra of extreme calibre : with cases, and a description of new instruments for their treatment / by F.N. Otis.

REMARKS ON 19.

STRICTURES OF THE URETHRA

OF

EXTREME CALIBRE,

WITH

CASES, AND A DESCRIPTION OF NEW INSTRUMENTS FOR THEIR TREATMENT.

BY

F. N. OTIS, M. D.,

CLINICAL PROFESSOR OF VENEREAL DISEASES IN THE COLLEGE OF PHYSICIANS AND SURGEONS, NEW YORK; SURGEON IN CHARGE OF THE DEPARTMENT OF GENITO-URINARY AND CUTANEOUS DISEASES OF THE STRANGERS' HOSPITAL, NEW YORK, ETC.

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SECOND EDITION, REVISED AND ENLARGED.

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REMARKS ON STRICTURES OF THE URETHRA OF EXTREME CALIBRE, WITH CASES, AND A DESCRIPTION OF NEW INSTRUMENTS FOR THEIR TREATMENT.[1]

Mr. President and Gentlemen: I desire this evening to call your attention, briefly, to a few practical points in the management of stricture of the male urethra.

In a paper, which I had the honor to read before this Association nearly two years since, I called especial attention to the influence of strictures of large calibre in perpetuating a purulent urethral secretion, concluding in the following terms: "*We may, then, affirm as a most important axiom, that the slightest abnormal encroachment upon the calibre of the urethral canal, at any point in its course, is sufficient to perpetuate a urethral discharge, or even, under favoring circumstances, to establish it, de novo, without venereal contact.*"

[1] Read before the New York Journal Association, November 24, 1871.

Since the foregoing aphorism was enunciated, my experience has resulted in a daily-increasing respect for slight and usually unsuspected narrowings of the urethral calibre, as a cause of establishing local points of irritation along the course of the urinary tract.

The following case presents a common phase of the difficulty alluded to:

Mr. J. W. R., a surgeon, aged forty-eight years, came to me in June last, complaining of soreness and persistent aching in the prostatic portion of the urethra, accompanied by a slight purulent discharge from the meatus. He had been a subject of gonorrhœal inflammation several months previously, and felt confident that this had resulted in the establishment of a low grade of inflammatory action in the prostate gland. With occasional suspicions of stricture, he had attempted to verify them by the use of sounds. At one time No. 25, of the French scale, was passed through into the bladder without obstruction, but, on other occasions, no larger than 20 F. could be introduced. He was, however, very positive that no organic stricture existed, but that the irritation, caused by the passage of the instrument, excited a spasmodic contraction of the membranous portion of the urethra, which arrested its progress. Attempting the introduction of a bulbous sound of as large a size as the urethral orifice would admit, viz., 27 F., I ascertained, first, that there was a stricture near the meatus. The bulb fitted the opening, but refused to enter. After steady, gentle pressure, continued for three or four minutes, it suddenly slipped through a narrow stricture about a quarter of an inch in depth. The bulb was now easily advanced for two inches, when another obstruction was encountered; this gradually yielded for about an inch, after which the passage of the sound, onward into the bladder, was easy and natural.

On the *withdrawal* of the instrument its bulb was arrested at a point 3¼ inches from the meatus by a stricture which presented a nearly uniform resistance for one inch, when it again glided smoothly outward until arrested by the previously-mentioned obstruction at the meatus. The handle of the exploring

instrument was now permitted to fall, and dangled from the extremity of the penis, its bulb so firmly held by the stricture that not a little traction was required to withdraw it.

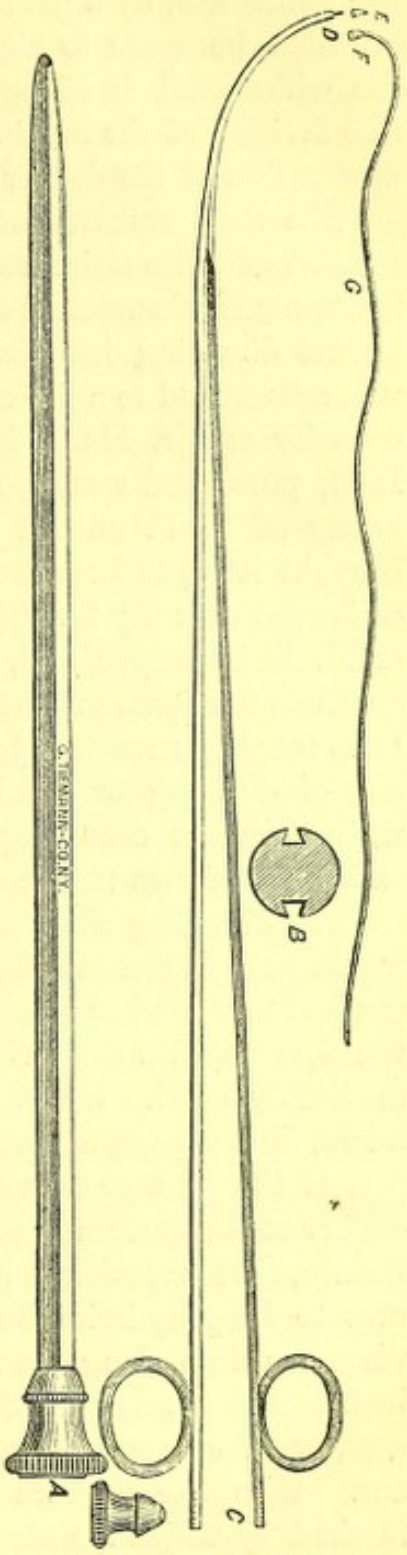
Here, then, we had a urethra, readily admitting the passage throughout its whole length of a No. 25 sound, of the French scale, and yet the presence of two decided strictures in its course positively demonstrated.

The stricture at the meatus was freely divided with the urethrotome of M. Civiale, and a No. 28 F. sound was passed through into the bladder. This operation was repeated, with increasing sizes, every third or fourth day, until a No. 30 F. sound was passed through the urethral canal, and continued at stated intervals for a fortnight. Still, the purulent oozing, though slight, did not cease. Believing that the full size of the urethra had been reached, and that the continuance of the discharge was due to the long-continued engorgement of the mucous membrane adjacent to the strictures, the use of the sandal-oil capsules was advised, under the influence of which it was hoped the trouble would soon disappear. The patient continued to take the capsules for a week, at the end of which time the discharge had quite ceased, but he still complained of uneasiness in the prostatic region, and still found shreds of mucus in his urine. Sound No. 30 F., of the Béniqué curve, passes quite readily, but the patient complained of unusual tenderness on its passage through the prostatic portion of the canal. From the locality and character of his sensations, he is confident that his whole trouble is now in the prostate. On the withdrawal of the sound, a little of a gray secretion was observed at its extremity, and which, under the microscope, was found to be largely purulent. This secretion, it seemed to me, had been brought from the prostatic portion of the canal. Examination per rectum revealed slight prostatic tenderness, but no hypertrophy. Endoscopic examination, half an hour after urinating, revealed nothing except a slightly-congested condition of the mucous membrane in the vicinity of the previously-mentioned points of stricture, and the presence within the prostatic portion of the canal of the secretion previously examined.

With these evidences of the existence or a chronic prostatitis, I injected five drops of a solution of nitrate of silver (grs. xxiv. to the ounce of distilled water) by means of Dr. Bigelow's prostatic syringe. Shortly following the injection, and for five or six succeeding days, the patient expressed himself as having felt a decided improvement; he also reported perceptibly less flocculi in the urine. Three injections, of the character previously used, were administered at intervals of eight days, but no further improvement resulted; on the contrary, a slight reappearance of the discharge at the meatus, with an increase of the prostatic discomfort, had occurred about the seventh day after the first application of the nitrate of silver. These symptoms again ceased upon the second application, but only to return at about the same time as on the previous occasion; a like repetition of the advance and retrograde movement occurred upon the use of the third and last injection. Suggesting the possibility of a stricture of large calibre still remaining, I introduced bulbous sound No. 28 F., and found that it accurately measured the stricture, the posterior boundary of which was 3¼ inches from the meatus, and which had been previously dilated to No. 30 F., three degrees above the supposed normal size of the urethra as indicated by the size of the meatus. I then introduced the shaft of Voillemier and passed upon it the largest dilating cylinder, measuring *thirty-two* millimetres in circumference, and corresponding with about No. 20 of the American scale. Under this distention the doctor recognized distinctly the sensation of rupture at the point of constriction. But little pain was experienced during the operation, and only slight temporary discomfort followed it. This occurred at 8 P. M., November 10th. Since that time the patient has been entirely free from the old unpleasant sensations in the prostate, and also from any sign of discharge from the urethra; the only evidence of any trouble continuing is the slight mucous flocculi that still appear in the urine.

I have now under my care another case, Mr. J. G. A., aged twenty-eight, in whose urethra some half-dozen bands of stricture from one-eighth to one-fourth of an inch in breadth are present, anterior to the bulb. These have been dilated so

that conical sounds from No. 28 to No. 30 F. have been passed with more or less difficulty, at intervals of from four to eight days, for nearly two months. A few days since I introduced Voillemier's divulsor with shaft thirty-two millimetres in circumference (the largest attainable), and with but little more discomfort to the patient than that which had followed the use of the 30 F. sound —yet bulbous sound No. 26 F. still defines the bands of stricture very distinctly. Such a degree of resiliency, in my own experience, is uncommon, although I have seen repeated instances where it was almost as great.



Voillemier's divulsor.

On a former occasion, the importance of recognizing a distinct individuality, in every urethra, was insisted on, and likewise, the measurement of the calibre of each, not by any popular standard, but by the introduction of the largest-sized bulbous sound that would pass the uncontracted meatus. With this as a guide, the discovery of urethras presenting a calibre freely admitting a 30 F. sound will not prove of so rare occurrence as at present supposed. Contractions at the meatus are a fruitful source of failure to appreciate abnormal narrowings of the urethra; the complete suppleness and resiliency of the tissues of the normal meatus is a good test of its freedom from organic stricture, but congenital contractions, to a greater or less extent, are not unfrequent. Here, both the natural

suppleness and resiliency may be present, and the deformity may escape notice, unless carefully sought. Wherever a bulbous sound can, by a gentle pressure of three or four minutes' duration, be made to slip into the fossæ navicularis, and in the withdrawal is abruptly arrested, the indication for the free division of the meatus is positive; without it no efficient exploration of the deeper parts can be effected.

The chief embarrassment which arises, after the demonstration of these strictures of large calibre, is from the lack of instruments of sufficient size to divide or rupture them. The largest divulsing instrument of Mr. Thompson, of London, will not expand to a size equal to more than 28 F. The largest capacity of Mr. Holt's instrument is not greater. My own Holt, purchased some years since, had only a divulsing capacity of 25 F. until I had a larger cylinder made, which brought it up to twenty-eight millimetres. The instrument of largest capacity for the internal division of stricture is that of M. Maisonneuve, and, with the widest blade, this only corresponds to a sound *twenty-eight* millimetres in circumference. It is scarcely necessary to call attention to the *entire incapacity* of dividing or divulsing instruments to deal efficiently with strictures occurring in urethras whose normal calibre exceeds their own measurement.

The divulsing shaft of Voillemier, measuring thirty-two millimetres in circumference, and which is the largest instrument of any kind at present in use for operations on stricture, failed to rupture the strictures in the case of Mr. J. G. A., previously cited. Of what possible consequence, it may be asked, is the presence of a stricture, of a calibre sufficient to permit the passage of a No. 32 F. sound, where the normal calibre of the urethra is evidently several millimetres smaller? Briefly, that experience has shown the power of such strictures to keep up irritation, and even a purulent secretion, at various points along the urinary tract, as was the case in the instances just related. Simple over-distention of such strictures, or of *any* strictures, is at best but a temporary expedient. Complete rupture or complete division is the only method by which the speedy return of a stricture to its original point of contraction can be prevented. Every practitioner

of much experience in operations for stricture must have been struck with the lack of uniformity in results by any and every method, as shown by the return of patients for treatment, after variable intervals from the date of operation. Taking into consideration the difference in the regularity with which patients continue the use of dilating instruments after an operation, it is evident that data on this point must of necessity be very imperfect; but I have noticed, in cases *where no after-dilatation was practised*, more permanent results in operations upon *tight strictures* than upon those of *large calibre;* and this, it has seemed to me, was because the tight stricture was more throughly ruptured or divided—that the stricture of large calibre was more likely to be simply over-distended or imperfectly divided, on account of its inferior density and greater dilatability, as well as from possible insufficiency of size in the instruments employed.

The great lack in all the means now in use for operations upon the variety of stricture under present consideration, viz., those of large calibre, is their want of adaptability to the dimensions of the stricture upon which operation is required. The operation is performed on the flaccid urethra; the amount of resiliency of the stricture is undetermined; the divulsing shaft is selected without exact data, and the appropriate size of blade in the cutting instruments is a matter of judgment, and very liable to error. In small strictures a certain positiveness of result is attainable, the stricture is divulsed or divided to an extent sufficient to relieve present emergency, but there is no certainty that the rupture or the division has been complete, and, unless this result is attained, the return of the stricture to its former dimensions is certain, and, unless combated by the regular and frequent use of suitable dilating instruments, is likely to be of speedy accomplishment. I would not be understood as at all undervaluing the great advantages—nay, blessings—that have resulted, and must continue to result, from the intelligent use of the admirable instruments of Maisonneuve, Holt, and others. In their prompt and ready application for the relief of close strictures they leave little to be desired, and must always occupy the prominent place in cases of emergency, when the chief consideration

is to relieve retention of urine, or the near liability to it. I would simply assert that there is an uncertainty in the extent of their action—uncertainty as to whether or not the stricture has been completely divided, or whether other tissue besides that involved in the contraction has not also been divided or otherwise injured, and that, in strictures of large calibre, they are, as at present constructed, often entirely insufficient. With the view of supplementing these important shortcomings, I have designed the accompanying instrument, which has been manufactured very perfectly by Messrs. Tiemann & Co., 64 Chatham St., under my direction, and was especially intended for operating upon the strictures of Mr. G. H. A., in whose case the 32 F. shaft of Voillemier was used without effecting their rupture.

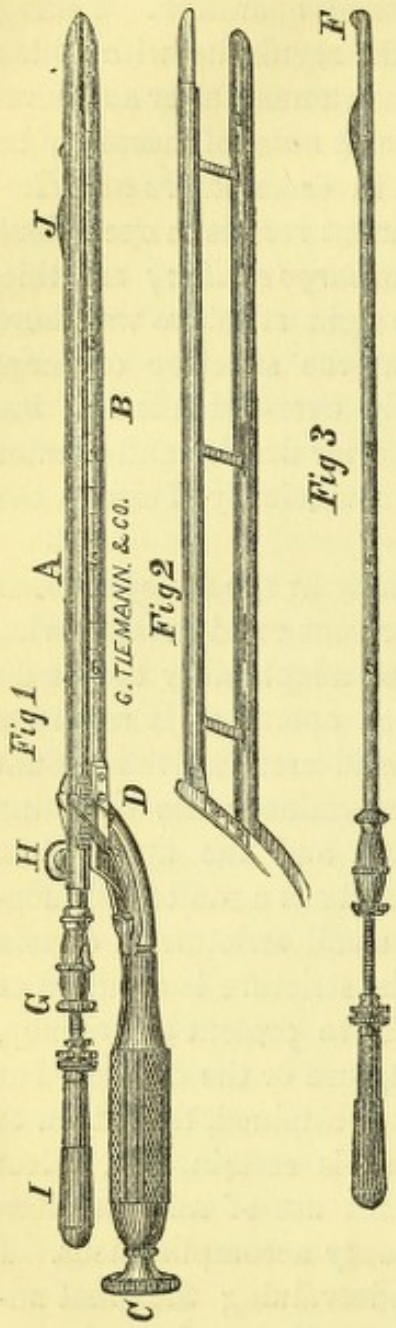


Fig. 1. Dilating urethrotome.
Fig. 2. Dilated.
Fig. 3. The urethrotome, which corresponds almost precisely with Dr. Peters's instrument.

The instrument which I term *the dilating urethrotome* consists of a pair of steel shafts (A & B), Fig. 1, connected together by short pivotal bars, on the plan of the ordinary parallel ruler, as shown in the expanded instrument at Fig. 2. Its expansion or contraction is effected by means of a screw which traverses the handle connected with the lower shaft, and is moved by means of the finger-button (C). Attached to the distal end of the screw is a pair of short, curved, registering arms, seen at D, Fig. 1, which ride through grooves on either side of the shafts (A & B), and are marked, on one side, with the divisions and corresponding

figures of the American scale, on the other with those of the French, in millimetres. Connected with the screw in the handle, the rise and decline of this register indicate exactly the degree of separation of the shafts, and consequently the precise progress of the dilatation of the instrument. Upon the inferior shaft (B) is engraved a scale of inches and quarter-inches, by which the depth of its introduction into the urethral canal may be noted. Up to this point the instrument is simply a *divulsor*, and may thus be used by introducing it into the urethra until its distal extremity is beyond the supposed point of stricture; the finger-button (C) is now turned, dilating the instrument, until, if considered desirable, the stricture is completely ruptured.

The upper bar of the instrument, however, which is hollowed out, is traversed by a urethrotome (Fig. 3),[1] the distal extremity of which terminates in a little metallic knob or indicator F, Fig. 3; by the metallic handle (G, Fig. 1) of the canula of the urethrotome, it is moved, at will, along through the entire length of the shaft (A) of the divulsor; a small button-screw, H, secures the canula at any point. Running through the canula and attached to the handle, I, is the staff of the urethrotome, terminating in a thin narrow spring blade, which, when at the extremity of the canula, is concealed in the deep groove which extends on its superior aspect through its entire length. On withdrawing the handle of the urethrotome I (its canula being fixed firmly at any given point by the button-screw, H), the spring blade (J, Fig. 1) rises out of the groove by means of a little elevation on its floor, rides over it, displaying the full width of the blade (from one to two lines) for half an inch, when it again drops down and is concealed in the groove of the canula.

The instrument, with its contained urethrotome, having then been passed down beyond the supposed or known point of stricture and dilated until the stricture is made tense, the button-screw, H, is turned, releasing the canula, which may then be drawn carefully outward until the knob or indicator,

[1] This form of urethrotome, with concealed spring blade, was invented by Dr. George A. Peters, of this city, and presented to the profession some years since.

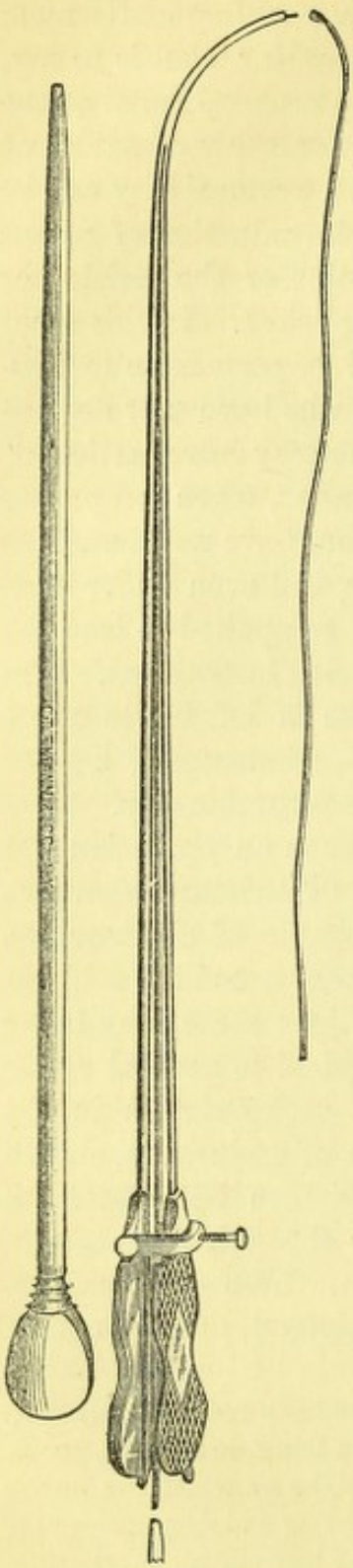
at its extremity, is arrested by the stricture. The canula is then advanced about half an inch and secured by a turn of the button-screw, H; a rapid movement of the handle, I, of the urethrotome, *outward*, brings its blade up through the stricture, from behind it forward, incising it almost instantaneously, and passing down again into its concealment. The finger-button at the extremity of the handle of the divulsor is then turned, and the instrument is again dilated sufficiently to ascertain whether or not the stricture is completely divided: if not, the knife may be passed down, *from before backward*, completing the operation. Should other strictures present, the use of the indicator, while the urethra is kept tense, will reveal the exact locality of each, and the blade may be applied as required. The especial advantages claimed for this instrument are, that it first makes the urethra *tense*—thereby establishing the stricture as a fixed point; that it is capable of being adapted to strictures of any size within its compass; that it accurately defines their locality and extent; that it attacks a tense instead of a flaccid stricture, and hence, that its work is approached with confidence; that its incisions are made with ease, at a predetermined point, depth, and extent, instantaneously—and hence, with the slightest possible discomfort to the patient; and lastly, that it combines great strength with ease and simplicity of manipulation. Since the completion of the instrument, now four weeks since, I have operated with it on six cases of stricture in the ante-bulbous portion of the urethra with complete success and satisfaction in every particular. Its compass is from 23 F. to 34 F., corresponding to 13 and 21 of the English scale. Messrs. Tiemann & Co. are confident of their ability to make one of similar pattern which shall range from 23 F. down to 18 F., corresponding to 13. and 9. of the English scale, and so curved that it may be applied to the deeper portions of the urethra; but it is for operation upon strictures of large calibre that this instrument has been constructed, and, except in such cases, especial superiority over others in use is not claimed. It will, however, I think, prove a valuable aid in completely restoring the natural calibre of urethras that have been imperfectly operated on by other

instrumental means.[1] At the opposite extreme, in the range of strictures of the male urethra, we not unfrequently meet with cases which are *practically impermeable;* that is to say, in which, from the tortuous course of the urethral canal at the seat of stricture, or from a lack of instruments of sufficient tenuity or flexibility, either or both, no permeability can be demonstrated such as will permit the introduction of means through which the bladder may be emptied or the division or divulsion of the stricture can be accomplished. In this sense strictures may be permeable to-day and impermeable to-morrow. There are, I think, few surgeons who have not demonstrated the patency of a stricture by the easy introduction of a filiform bougie, and, in a day or two after, when preparing to operate by internal rupture or division, have not found the filiform guide refuse to pass the stricture, and even under complete anæsthesia, neither be coaxed nor compelled to lead the way for the shaft of the cutting or divulsing instrument. Under such circumstances no proper course is left but to allow the patient quietly to awake to the consciousness of a great disappointment, and to wait for a more favorable day.

Unfortunately, it is not always that such an operation can be postponed. For instance, in cases of stricture where, in usual health, the urethra will admit a bougie of eight or ten millimetres in circumference; in any such, a sudden cold, an excess at table, or other comparatively slight cause, may bring about a retention of urine that will not yield to general measures; and, finally, when the agony of accumulation in the bladder has gone on to the last degree of endurance, should no immediate passage through the stricture be effected, a resort to tapping above the pubis, or through the rectum, alone can save the sufferer from death. This great misfortune, and that lesser one, previously described, are often due,

[1] The only dilating urethrotome of which I find any record is that of M. Reybard (Traité Pratique des Rétrécissements du Canal de l'Urètre, par M. le Dr. Reybard, Paris, 1843, p. 205). The principles on which the instrument of M. Reybard was constructed required long and deep incisions of the urethral canal, in consequence of which, "the instrument, never extensively used, has fallen into disuse" (Thompson on Strictures of the Urethra. Third edition. London, 1869, p. 235).

not to a want of skill, or intelligent effort, on the part of the surgeon, but simply to a lack of suitable instruments with which to afford relief.



Holt's dilator.

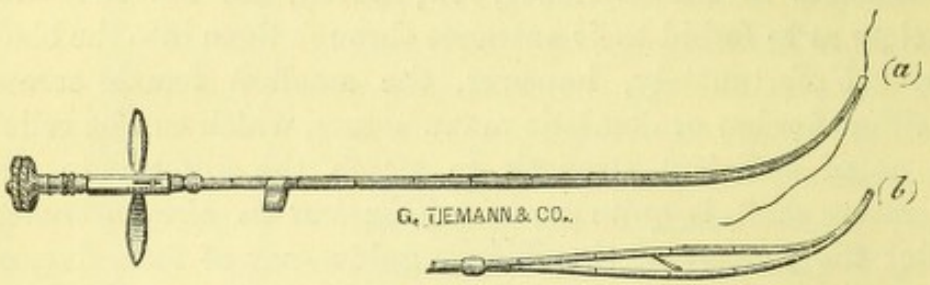
The time is within the memory of many present, when every case of close stricture, complicated with retention of urine, was considered a fair subject for *puncture of the bladder*, and when *perineal section* was the only recognized method of dividing a stricture; but (thanks to M. Perreve, M. Maisonneuve, Messrs. Holt, Thompson, Bumstead, Gouley, and others, who have invented or revived, improved and popularized, methods and instruments for the internal division or rupture of strictures) the operation of tapping the bladder occurs as a rare accident, and the performance of a perineal section is confined to cases of extreme difficulty and gravity.

The great advantage thus gained in being able, in the majority of cases, to substitute a rapid and comparatively painless and safe operation, for one tedious, difficult, and dangerous, can scarcely be over-estimated; and hence, inventions of new means, or modifications of those already in use, which will bring a still greater proportion of cases within the reach of one or the other of the immediate and internal methods of operating upon strictures, cannot but be worthy of your attention.

I hold here in my hand the shafts of three of the most common and approved of the instruments for operation upon stricture of the urethra by divulsion and

internal urethrotomy, viz., those of Thompson, Holt, and Maisonneuve, and of the smallest variety manufactured. The circumference of the shaft of each, in the order in which they have been named, is 12, 10, and 7 millimetres. Now, to make an operation possible by any one of these instruments, its shaft must first pass certainly and entirely through the stricture. For the purpose of facilitating and securing this passage, the filiform guide of M. Maisonneuve, of a somewhat smaller calibre, is attached to each by means of a delicate screw, the male thread of which is upon the extremity of the shaft, the female thread upon the filiform guide. This fine flexible bougie has but to be gently slipped along within the urethra, easily avoiding here and there the natural obstacles which oppose its passage; as these guides are manufactured as small as *three* millimetres in circumference, few, indeed, are the strictures so close as to forbid their entrance through them into the bladder. Unfortunately, however, the smallest female screw, of either foreign or domestic manufacture, which can be relied on as of sufficient strength to attach the filiform to the operating shaft, is quite *seven millimetres in circumference.* After the passage of the filiform guide—say of four, five, or six millimetres in size—through the stricture into the bladder, the next step in the operation is to screw on the operating shaft of whatever instrument it is decided best to employ. This now readily follows the guide until arrested at the point of stricture *by the female screw of seven millimetres in circumference.* The filiform has easily passed the obstruction, and its distal extremity is unequivocally coiled up in the bladder; but the shaft of the instrument will not readily follow. An important question now arises: How much force may be safely used in advancing the shaft? and, further, how shall we determine the direction in which it may be exercised? Although the guide may be well in the bladder at the commencement of the operation, this is no sufficient guarantee against a subsequent deflection of the operating shaft, as *the filiform may be dragged out of the bladder, and doubled back upon it*, which *must* take place should the shaft be forced out of the canal anterior to the stricture. This is an accident which may occur without the use of any very great amount of force. Permit me to cite a case in illustration.

In September last a gentleman (Mr. J. G. G.), aged fifty years, came under my care with the following history: Had an attack of gonorrhœa in youth, and had suffered with stricture since 1849. This had been dilated from time to time, but of late he had neglected this treatment, until, his micturition growing quite difficult, he became alarmed lest he should have an attack of retention of urine, and came on to New York for relief. Examination by an eminent surgeon of this city revealed two strictures—one three and a quarter inches from the meatus—the other five and a half inches. Filiform No. 2½ (French) was passed into the bladder, and represented the calibre of the deeper stricture. No. 17 (F.) passed the upper or anterior constriction. Immediately subsequent to this examination (which took place on



Thompson's dilator, adapted to Gouley's guide-bougie.

the 26th of August), the patient attempted to take a warm bath, but the water proved to be cold, and an attack of retention of urine followed in a few hours. For this latter difficulty he was attended by a second surgeon, who employed all the approved general means adapted to such cases, but failed to relieve the retention. Catheterism was carefully tried, but was decided to be impracticable. On August 28th—the patient then in very great suffering—a consultation was held, in which it was determined to attempt relief by an immediate operation upon the stricture. A filiform guide was readily passed into the bladder, and Thompson's dilator was screwed upon it. An effort to pass this instrument into the bladder was followed by its arrest at the deeper stricture. Hæmorrhage ensued, and the patient (who had not been etherized) complained of severe pain in the attempted advance of the instrument. It was, however, finally passed *by* the obstruction, and on, until it was supposed to have entered

the bladder. A full divulsion was then made, and the instrument was withdrawn. On the passage of a catheter, only blood followed. It now became evident that the dilator had left the urethra, probably at the point of stricture, and that the bladder had not been entered. It was then decided to relieve the urgent trouble of the patient by tapping the bladder over the pubis. This operation was successfully performed, and a large amount of urine was drawn off through a No. 12 catheter, which was retained in the wound.

On the 3d of September, six days after the operation, the patient passed a small stream *through the urethra*, though with severe smarting. The retention catheter was then removed from the bladder. Since the operation there had been marked general febrile disturbance, and a persistent, dull pain in the perinæum: a free purulent discharge from the urethra had existed for three or four days.

September 14*th*.—Purulent discharge from the urethra continues. Examination revealed a false passage in front of a tight stricture, about six inches from the meatus. Some swelling and tenderness in the perinæum. Temperature 101½°; pulse 84.

September 21*st*.—Fluctuation recognized about two inches to the right of the perineal raphé. A deep incision resulted in the discharge of about two ounces of thick, sanious, offensive pus.

October 1*st*.—The patient came under my care; he was then very feeble, but free from fever. The abscess in the perinæum had nearly filled up. He stated that until within a few days he had passed a small quantity of urine through the opening in the perinæum during micturition. At this time no urethral discharge was perceptible. The wound over the pubis, resulting from the puncture of the bladder, was entirely healed. Examination, per rectum, revealed very slight enlargement of the prostate, and some induration of the tissues on the right side adjoining, but not the least tenderness at any point. Filiform No. 7 (F.) was passed through the urethral canal, and into the bladder, without the least obstruction. Further operative measures were deferred, on account of the feeble condition of the patient.

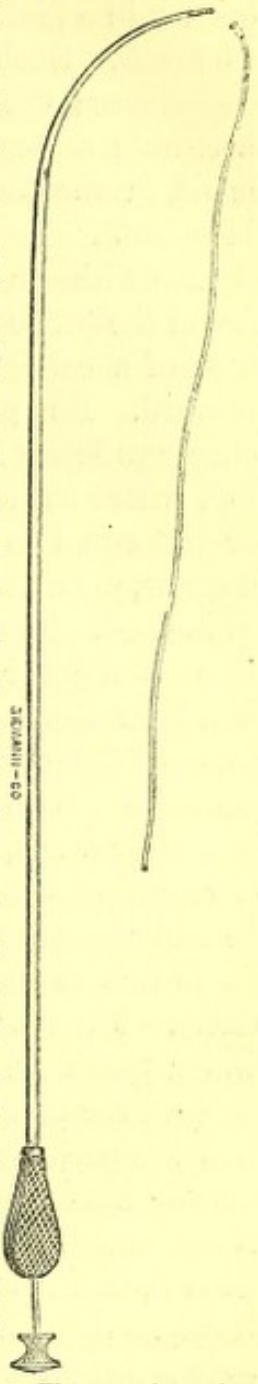
October 10th.—The general condition of Mr. G. having greatly improved, at 3 P. M. he was fully etherized. A filiform guide, of the size previously used (seven millimetres in circumference), was passed down through the strictures. To this was attached the shaft of the urethrotome of M. Maisonneuve, which readily followed the filiform guide. In order not to bring too great a strain upon the long, delicate staff of the instrument, the smallest blade was selected and slid down the groove in the shaft, completely through both strictures and well into the bladder. For assurance of complete division, a broader blade was then similarly employed. Directly succeeding this operation a silver catheter, No. 25 F., was introduced, by means of which the bladder was easily reached and thoroughly emptied. A quarter-grain suppository of the acetate of morphia was then passed into the rectum of the patient, and, on his recovery from the influence of the anæsthetic, ten grains of the sulphate of quinine were administered, and directions given to have this dose repeated six hours after.

October 16th.—Patient is up and walking about. Has not had an unfavorable symptom, nor a pulse above 84° since the operation. Sound No. 23 F., and increasing, passed every third day.

October 22d.—Has learned to pass an instrument himself (No. 25 F.), which is believed to be the full capacity of the normal urethra. Discharged, cured.

In reviewing this case of Mr. J. G. G., it appears that the two positive indications that the shaft of the divulsing instrument was in danger of leaving (if it had not already left) the track of the urethra, viz., *hæmorrhage* and *pain*, were disregarded, and it is in point here to remark that, as a rule, when these indications are combined in any case of attempted exploration of the urethra, it is the peremptory duty of the surgeon to withdraw the instrument. Puncture of the bladder becomes an insignificant operation, both in its performance and in its results, as compared with the probable consequences of the establishment of a false passage from the point of stricture down into the perinæum, than which, once the departure from the urethra has been made, nothing is easier to effect or more difficult to avoid. If it ever becomes necessary to use

even a moderate degree of force in following up the guide, it should never be attempted, except by one who possesses the *tactus eruditus*, which can only be acquired by a long and studious experience. The filiform guide, after it has been introduced, *must run easily through the stricture, and its extremity be felt to be free, or its presence in the bladder cannot be verified.* The shaft of any operating instrument should *readily* follow the guide. It seems to me that, in the present case, the prime cause of disaster was the want of a proper correspondence between the size of the operating shaft and the previously-ascertained calibre of the stricture. With the limited means now in use, this correspondence is often impossible, as the smallest filiform bougie to which a screw can be properly attached is not less than *seven millimetres in circumference*, and the smallest shaft (that of M. Maisonneuve's instrument) is *fully seven* millimetres in circumference, while that of Holt, and also that of Voillemier, is *twelve* millimetres, and that of Thompson is *ten*.



Thompson's probe-pointed catheter (Bumstead's modification).[1]

In order to remedy this difficulty in operating upon strictures of a less calibre than these instruments, the stricture must first be forcibly dilated nearly or quite up to the size of the operating shaft. Now, the mode of accomplishing this necessary dilatation, so as to avoid danger of the accident previously described as occurring in the case of Mr. G., is the desideratum. Mr. Thompson conferred a boon on the profession when he gave to us his probe-pointed catheter for the purpose of dilating a close stricture, and through it emptying the bladder. This instrument, however, is defective, inasmuch as you get no positive evidence of its presence in the bladder until it has passed three or

[1] Modified by the addition of Maisonneuve's filiform guide.

four inches into that viscus. Besides, the stylet of the probe-catheter extends only to its eye (the weakest part in the instrument), and at this point, after the repeated bendings, necessary in adapting it to different emergencies, it is very liable to break. Such an accident has occurred twice within my experience: once in my own hands (fortunately outside of the urethra); and again a few days since, with quite a new instrument, in the hands of one of the *internes* of the Strangers' Hospital.

Notwithstanding these imperfections, I have frequently found the probe-catheter of essential service in dilating strictures of a calibre ranging from three and four millimetres upward. Its probe-point, three millimetres in circumference, gradually increases in size, so that at the point of opening, where the stylet terminates, its size is seven millimetres, or just equal to that of the smallest filiform guide, to which a screw, for attaching it to the smallest operating shaft, can be connected. The following cases, lately occurring in my service at the Strangers' Hospital, illustrate its value: George W., New York, aged thirty-three, harness-maker, had an attack of gonorrhœa four years ago, lasting eight months. A year ago first noticed difficulty in making water; this grew gradually worse, until, on taking cold, it culminated in an attack of retention of urine lasting thirty-six hours. Two weeks ago he had another attack of retention, not so severe as the first, for in this he was always able to pass a few drops after great effort. The difficulty continued for ten days, when he passed water much more freely. At this time (April 11, 1871) he entered the Strangers' Hospital. On examination, the patient was found in good general condition, but with his bladder greatly distended, reaching within an inch of the umbilicus. Examination of the urethra shows meatus contracted to No. 14 (F.), and a stricture admitting No. 12, at a depth of two inches. Another at the bulbo-membranous junction admitted only a filiform bougie No. 1 (F.).[1] Though the bladder was so greatly distended, the patient was voiding, *guttatim*, a fair quantity of urine, and had no constitutional disturbance; it was therefore concluded, in the hope of avoiding the neces-

[1] Three millimetres in circumference.

sity of a perineal section, to attempt a gradual dilatation of the stricture until it should admit the necessary instrument for immediate operation.

April 14*th*.—Guide of four millimetres, closely hugged by the deeper stricture, was introduced into the bladder, and the shaft of Maisonneuve screwed on the filiform; too tightly held to be advanced by the shaft, it doubled back upon it at the meatus; operation again postponed for further deliberation.

April 19*th*, A. M.—Further attempts, under my direction, have failed to introduce a filiform larger than No. 4 (F.). Attempt to pass Thompson's probe-catheter also failed. Distention of bladder increased; urination more difficult; ordered one-fourth grain of morphine and hot bath. In the evening, patient passed water quite freely in the bath, and is much more comfortable.

April 21*st*.—Patient has had a chill. Pulse 108, temperature 103; bladder has reached the umbilicus; puncture of the bladder or perineal section seemed unavoidable. Another attempt with the probe-catheter determined on; was successful in advancing it eight inches. No blood or acute pain following, I concluded that the probe-point of the instrument was through the stricture six inches from the meatus. Guiding it with my finger in the rectum, I made steady, firm pressure for five minutes, and by this means succeeded in advancing the instrument still farther; assured, by sensations imparted to my fingers and the expressions of the patient during this effort, that I was still in the urethral canal, on withdrawing the stylet, a drop of urine announced the success of the expedient, and also the presence of the entire probe-point, three inches in length, within the bladder. I had now no hesitation, with my finger still in the rectum, in pushing the catheter directly on to its largest dimensions, viz., seven millimetres. After the withdrawal of a small quantity of urine, the eye of the catheter became occluded and was removed. Filiform guide No. 7 readily introduced, and Bumstead's modification of Thompson's catheter attached. By means of this the stricture was again passed, the over-distention of the bladder relieved, and the stricture dilated (as with the Thompson) to No. 10 (F.), the largest dimension of Bumstead's modification.

The stricture being now of sufficient size to permit it, the staff of Voillemier's dilator was screwed upon the filiform, and passed through the stricture and into the bladder without difficulty, the shaft No. 25 (F.) driven home, and the instrument withdrawn. The bladder was then emptied with catheter No. 22 (F.), the usual suppository of one-fourth grain of morphine and the ten-grain dose of quinine were administered. The case progressed favorably up to the 28th inst., when the patient, able to introduce a full-sized sound No. 25 (F.), was discharged, cured.

Case II.—John Burns, Englishman, carpenter, aged fifty-four, admitted to the Strangers' Hospital June 20, 1871. Contracted gonorrhœa in 1832, followed by stricture several months after, stream became very small, retention occurred frequently, requiring the urine to be drawn off with the catheter. Was successfully operated on in 1847 by the perineal section, and remained quite free from any trouble for twelve years. In 1869 he had a fall, striking upon his perinæum, since which time his old difficulties have returned and his attacks of retention have been frequent and severe.

June 20th.—Examination revealed, externally, the cicatricial evidences of the perineal section previously mentioned; internally, two and a half inches from the meatus, a stricture, calibre No. 15 F., a second at six inches in depth, through which a filiform bougie, three millimetres in circumference, refused to pass. Fine whalebone instruments of different curves were also tried, but with no better result. Bladder extending a couple of inches above the pubis; patient voids a small amount of urine, from time to time, *guttatim*, occasionally, by a fine, small stream. Failure of instrumental measures attributed to spasmodic action, as the bougies were hugged closely at the point of stricture.

During the following six days, general means were employed to reduce the spasmodic action, and other attempts to effect a passage of the strictures were made, but failed. An intercurrent attack of ephemeral fever delayed further interference until July 5th, when it was determined to etherize the patient and operate by such means as, in the progress of the preliminary explorations, the case might demand. Under ether, after

a long trial, a small filiform guide was passed into the bladder, but closely held by the stricture. On attaching the staff of Maisonneuve, it was found impossible to advance it beyond the meatus, *the guide always doubling back upon the staff.* Perineal section then seemed the only course left to pursue, when, as a last effort to avoid this extreme measure, the fine probe-pointed catheter[1] was introduced, and by means of a finger in the rectum it was at last forced through the stricture, until, on withdrawing the stylet, a drop of urine announced its presence in the bladder. The catheter was then pushed on until its full calibre (seven millimetres in circumference) was passed through the stricture, and withdrawn. Another of larger size was then used, and the stricture dilated to No. 8 F. No difficulty was now found in introducing the guide and staff of Maisonneuve, after which the strictures (the deeper of cartilaginous density) were divided and a No. 20 F. catheter passed into the bladder. The patient made a good recovery, and was discharged on the 18th.

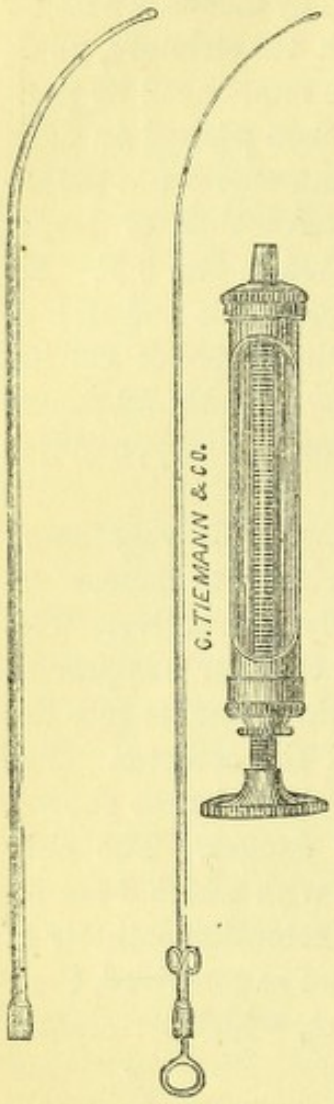
The value of proper dilating instruments of very small calibre is evident in the examples I have cited; to these, if occasion required, I could add others equally instructive. The imperfection of Thompson's probe-pointed catheter is apparent, in the necessity for its insertion some three inches into the bladder before the entrance of the eye of the catheter. The stylet reaching only to this point, is, as I have before shown, an element of very great weakness and danger. The only other instruments for the same purpose with which I am familiar are the grooved steel staff, and the retention-catheter of Dr. J. W. S. Gouley of this city. These are so contrived, that, through a groove on their inferior aspect, which terminates

Dr. Gouley's canulated staff.

at their extremity in a short canal, they may be slid down on a whalebone, or other bougie, previously introduced through the stricture. They are of exceeding service in many cases, and the *principle* in tortuous strictures is invaluable, but, as

[1] Thompson's.

usually found, these instruments are relatively of *six* and *eight* millimetres in circumference. The steel staff may be made much smaller, but it gives no positive early proof of its presence in the bladder, and the retention catheter, the eye of which is three-quarters of an inch from the point, can scarcely be constructed of a size to be useful in cases such as I have cited.

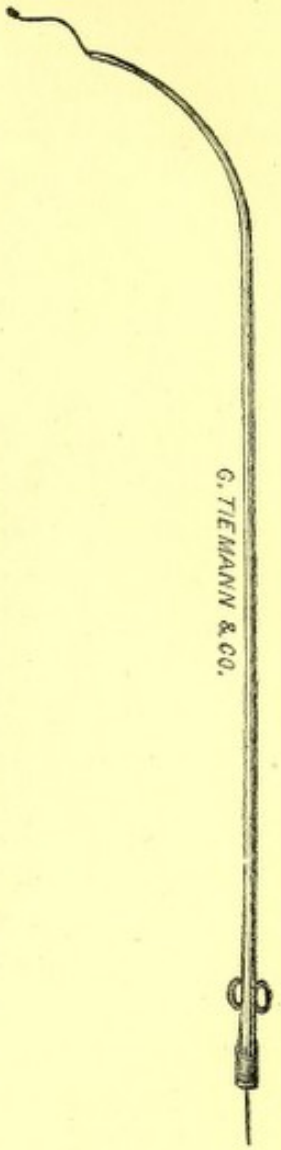


Dilating catheters and testing syringe.

With the view of affording aid in the preparatory dilatation of strictures too small to admit the necessary instruments for immediate operation, I have designed the accompanying modification of Mr. Holt's probe-pointed catheter. It consists simply of a fine probe-pointed silver tube, eleven inches in length and three millimetres in circumference at its point, gradually increasing in size, so that at six inches it is six millimetres. This tube is traversed by a steel stylet throughout its length. Carefully insinuated through a close stricture, by the aid of a finger in the rectum, until its point may be supposed to have reached the bladder, the stylet is removed and a small syringe is applied to its proximal opening. If the instrument has passed the *sphincter vesicæ*, on a withdrawal of the piston, the urine will appear in the barrel of the syringe. The instrument may then be confidently pressed onward until the stricture is dilated to the largest capacity of the tube—a second tube, of corresponding form, but with dimensions ranging from four millimetres at the point to eight millimetres, may then be similarly used.

In cases where, on account of the extreme closeness of the stricture, or from its divergent or tortuous course, a difficulty in passing the instrument occurs, Dr. Gouley's whalebone

guide-bougies will prove serviceable.[1] These are used as in his grooved, canulated staff, viz., by the previous introduction of the guide-bougie into the bladder, *threading the dilating catheter upon it and following it down through the stricture.* Succeeding in this maneuvre, the guide-bougie may be removed—the presence of the dilating catheter in the bladder tested by aid of the syringe—the stylet introduced and the stricture dilated, as previously described. The whalebone guide-bougies, to be used in this manner, require to be from sixteen to eighteen inches in length. They are easily made of *any* desired length and fineness, and, by steaming, or boiling in oil, may be moulded at the extremity to any curve or angle deemed most likely to adapt itself to the eccentricity of the stricture.



Dilating catheter threaded upon the whalebone guide-bougie.

In comparison with all other instruments for the same purpose, the relatively smaller calibre of the dilating catheter must give it an important advantage in cases of stricture of extreme tenuity. Through its successful use, the earliest possible assurance of entrance into the bladder may be acquired. It is of simple construction, of flexible material, and of uniform strength. It will, I feel confident, enable the judicious and experienced surgeon to accomplish a satisfactory dilatation of many strictures, which, without its aid, would necessitate a puncture of the bladder or the perineal section.

[1] Dr. Gouley, Lectures on Stricture, New York Medical Record, March 15, 1870.