CLINICAL LECTURES

ON STRICTURE OF THE URETHRA.

Delivered in University College Hospital.

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LECTURE III.—GRADUAL DILATATION (*Continued*).

BEING furnished with suitable instruments, the next point is to prepare your patient. Let *Festina lente* be your motto. Get rid of any concurrent source of irritation. Violent exercise of all kinds must be avoided, especially long walks on the days the bougie is passed. The digestion should be good; diet plain, and almost free, if not wholly so, of fermented liquors. The urine should not be charged with albumen, and quite free from blood. Should acute or subacute urethritis be present, that must be subdued before a bougie is passed. There should be no chronic retention and consequent cystitis. If the kidneys and bladder be much irritated by the stricture, they must be relieved by rest in bed, saline purges, and the regular complete evacuation of the bladder through a catheter small enough to pass the stricture readily, which may be either tied in continuously, or passed twice or thrice daily until the urine is acid as it escapes from the bladder and nearly free from pus. The patient being ready for treatment, and the position and calibre of the several strictures being ascertained, the urethra is gradually accustomed to the passage of bougies by never passing one large enough to be firmly held in the stricture. Not more than two or three sizes should be passed at each visit, and each sitting should be begun with a size smaller than the largest passed at the preceding sitting. Nor should the sittings take place oftener than twice, or at most thrice, a week. Usually, two clear days should intervene between each sitting. Instruments are best passed in the morning, most easily before the patient rises from bed; therefore it should be an invariable rule to require the patient to make his visit to you the first business of the day, and to drive to your house if he live at a distance. Both sounds and flexible bougies should be well warmed in cold weather, and oiled with weakly carbolic olive-oil. The best position for the patient is horizontal: the head comfortably raised, and the knees slightly supported by a small bolster or pillow under the hams. The muscles and fasciæ are thus more completely relaxed, and there is no danger of the patient suddenly falling if he faint: an accident that may happen without warning, and quite irrespective of the slightest pain or dread of the operation. Patients who are accustomed to the operation may be allowed to stand if they prefer it, as there is no danger of their falling through faintness. If they stand, they should lean against a wall or other support, with their feet a foot or so asunder, that they may be balanced without effort of the pelvic muscles. Thus the perinæum is more lax. Having placed your patient in suitable position, it is best to pass the instrument always on the same plan; for by doing so the operation, by force of habit, becomes easier to the surgeon, and less likely to annoy the patient by little hitches or interruptions, which, if they give no pain, may disconcert him and diminish his confidence in the surgeon's skill.

In passing rigid instruments, the horizontal position is always best for cases of stricture, though for certain conditions of the bladder it is advantageous that the patient be upright. There are three parts of the urethra in which an instrument is liable to hitch; and, as these hitches are more likely to happen with a rigid than with a flexible instrument, I will briefly advert to them. The first is the fossa navicularis in the roof of the urethra, just within the meatus. This is readily avoided by directing the point of the sound against the floor of the urethra; but, after that point is passed, the beak, as a rule, should be kept gently pressing along the roof. The second locality for catch or stop is at the end of the bulbous part, just where the urethra passes through the anterior perineal fascia. Here the floor of the bulb can be easily depressed by the sound, so that the beak strikes the wall of the urethra below the point where it perforates the perineal fascia: an obstruction that is

easily avoided by keeping the sound along the roof of the urethra. The last obstruction is one also produced by pressing the instrument downwards towards the anus during the last part of its passage. The beak catches in the prostatic portion, and thrusts before it the neck of the bladder until, that part being stretched, the sound slips on with a sudden painful jump; and the operator explains the mishap by talking of "stricture at the neck of the bladder". Bearing in mind these pitfalls in your route, avoid them by directing the beak away from them. Pass your sound thus:—the patient lying flat, shoulders low, especially if he be corpulent, so that his belly may be out of the way of the stem of the sound,—go to his left side and hold the sound, beak downwards, lightly by the handle between the thumb and first two fingers. So held, the impediments experienced by the point of the sound are most quickly detected; and, which is equally important, you cannot inadvertently give the instrument a thrusting impetus; for it must always be borne in mind that no more force is to be used with a rigid than can be applied to a flexible instrument. Then take hold of the penis behind the glans between the middle and ring fingers of the left hand, leaving the thumb and forefinger to push back the foreskin and expose the meatus. Next, holding the instrument across the patient's left groin, draw the penis on to it with the left hand; the right hand, after it has for a moment directed the point against the floor of the urethra, remaining motionless. When four inches of the sound have disappeared, carry the right towards the umbilicus without raising the sound from the patient's body; then push onwards the beak while the stem is raised from a nearly horizontal to a vertical position, and from that lowered again towards the patient's feet. By a proper combination of these two movements—the onward passage and the elevation and depression of the stem—the beak is kept sliding against the roof of the urethra, slips through the perineal fascia, and enters the bladder without catching in any of the irregularities already mentioned. In carrying the instrument through the curve, no force must be used; nor must the rapidity of this sweeping movement exceed the rate of progress of the beak, or that point will be tilted upwards too much to allow it to pass under the symphysis pubis, and a violent strain will be put on the urethra by the long leverage of the stem, besides causing an abrupt arrest of the progress of the sound. *Post mortem*, I have produced transverse laceration of the urethra at the point where it is fixed to the perineal fascia, simply by forcible and hasty sweep of the sound. Of course, on the dead body, much force was employed purposely to demonstrate the injury that may ensue from clumsy management of this long lever, if it be used as a lever at all. But, in the living, the pain felt by the patient is caused by improper stretching of this part of the urethra, though the strain may not be great enough to cause laceration. In withdrawing the sound, the stem is carried upwards and backwards in a direction contrary to that it followed when the beak traversed the bulbous and membranous-prostatic portions. To the foregoing must be added some additional directions for manipulations to pass the abnormal obstructions of stricture. These obstructions, as well as those caused by unskilful operators who may have preceded you, lie most commonly in the floor; hence they are generally avoided by keeping the beak steadily sliding along the roof. But not infrequently the direction of the urethra at the entry of a stricture is diverted to one or other side or downwards; and thus the point, when it fails to enter along the roof, must be methodically applied to the other parts—first to one side, then the other, and lastly to the floor. If a false passage exist, that generally starts from the left side of the mouth of the stricture when the patient has been operated on by others, and from the floor or right side when he has himself been passing sounds. By patience, lightness of hand, and constantly recollecting the natural direction of the urethra and the direction of the point, as indicated by the position of the handle, most, if not all, urethral strictures can be passed by rigid instruments, though often less speedily and less pleasantly than by flexible ones. Hence generally it is wise to reserve rigid instruments for cases where flexible ones are unavailable.

To pass flexible bougies, commence as for passing the rigid sound, and, pushing back the prepuce with the left thumb and forefinger, draw gently forwards the whole penis, so as to stretch the spongy portion of the urethra. Introducing the bougie with the right hand, holding it lightly with the tips or the fingers, direct its point at first along the floor to avoid the navicular fossa in the roof. After that, simply push the instrument steadily onwards. If it catch at any point, usually the floor of the bulb, use no force to push it on—that only deepens the depression in which the bougie has caught; but withdraw it a little, and roll it between the finger and thumb to disengage the point and make it, in its somewhat twisted condition, press against another side of the urethra. Should it still hitch at the same place, after two or three patient attempts, withdraw the bougie and employ one with a different point—an English one in lieu of a French one, or *vice versa*; so that

the impediment which arrests one may not be struck in the same way by a point of another shape. Give the English bougie a little curve by softening it well in hot water, and then plunging it into cold water while holding the instrument in curve. Such a point can be directed along the roof of the urethra, and thus escape the pitfalls of the floor. An instrument arrested by being too large to pass a stricture gives a sense of resistance different from that caused by stoppage of the point. In the first, the bougie is held by the stricture, and a little force is needed to withdraw it; in the second, the bougie, not being grasped, is drawn away without clinging, or oftentimes is ejected by the urethra, so that it slips slowly out again if left to itself. Having passed your bougie through the stricture—into the bladder, if you please, though that is not necessary—withdraw it at once. Do not leave it for a few minutes in the urethra: a practice still followed by some surgeons. If left in the urethra for a few minutes, muscular spasm is excited, often a severe spasm; but no further or vital dilatation is procured until the bougie has been for several hours in the urethra.

This process of interruptedly passing instruments is continued till the stricture is widened sufficiently for an instrument as large as the meatus to pass readily; or, if that outlet be below No. 24 or No. 25, it should be incised when it no longer allows the larger bougies to pass. You will recollect that, as I have already pointed out, much of even a tight sub-public stricture may be due to reflex spasm of the muscles there—spasm excited by the irritation of a narrow meatus, or of a narrowing of the urethra half an inch from that point. Such contractions near the meatus are vainly treated by interrupted passage of bougies, and are speedily managed by internal division. The deeper stricture will then frequently be found to have vanished. In appropriate cases, the earlier dilatation is employed the more likely is it to be successful; but, to be of permanent benefit, it must be long continued. Hence, when you have restored the strictured part of the urethra to, or pretty nearly to, the diameter which you have ascertained by preliminary measurement the non-strictured parts possess, train your patient to pass a full-sized bougie himself, and impress upon him the necessity of doing this at regular intervals for a long time—possibly for life. Never let a patient quit your hands till he is master of an instrument that fairly distends his stricture, and impress upon him the unavoidable necessity for using it. Exert all your persuasive power, still you will often fail; and I know none more remiss in carrying out this instruction than our own medical brethren, when sufferers in their own persons. Every now and again, you will find that your quondam patient returns to claim your aid in re-establishing that distensibility of the canal which he has neglected to keep up himself.

In describing the methods of passing sounds and bougies, it was assumed that the strictures to be treated were not of extreme contraction, but that the passage was still wide enough for the urine to escape in a stream. Let us now consider the resources which exist for passing instruments through very narrow strictures. Syme used to declare that an instrument could always be got to the bladder whenever urine was passed *per urethram*; and, if not invariably true, the cases where this is impossible are most rare. To conquer in difficult cases, is generally a question of patience and tenacity. Spin out your patience and fine down your bougie sufficiently, and you will generally succeed. An important preparation in difficult cases is complete rest in bed, with warm baths and saline aperients. A week or a fortnight so occupied is often saving of time in the end. Thus constitutional pyrexia and spasmodic irritation and inflammatory congestion are often removed; so that nothing remains to be dealt with but the permanent fibrous thickening, which, as museum preparations abundantly show, is rarely *per se* too narrow to allow a small instrument to pass. At length, when general and local conditions are favourable for your first sitting, allow plenty of time, and be provided with a variety of small instruments. Of filiform bougies, as they are called, there are fine tapering French bougies of silk, catgut, whalebone, or silkworm-gut—Nos. 1 and 2 of the French scale. English flexible catheters, called No. $\frac{1}{2}$ by the makers, are about two or three millimètres in circumference, and are as small as an open tube can be made. Thin whalebone bougies of extreme fineness, but twenty-six inches long, are also useful, as along one of them, when it has cleared the stricture, a fine silver catheter open at both ends can be threaded. Mr. Coxeter has made such a catheter for me one millimètre in circumference. A small exhausting syringe, with a nozzle to fit these fine catheters, is useful, in order to test its actual presence in the bladder by drawing out a few drops of urine, when the narrowness of the interior, blocked by mucus or a clot, delays the flow of urine. A small syringe to inject two or three drachms of olive-oil into the urethra, so as to distend the passage while the narrow bougie is passing along it, is also at times serviceable. Mr. Lund of Manchester passes along the urethra to the tight stricture the straight part of a silver catheter (No. 12 or 13 French), through which he

then slides down the filiform bougie to the tight stricture, and thus saves himself from the annoyance of having his filiform bougie hitching obstinately in a pocket before the stricture is reached. This plan is better than that, adopted by some, of passing down filiform bougie after bougie until, all the false passages and pockets being filled, the last bougie, having no other road open, is obliged to go through the stricture. This method, pretty in theory, I have often found to fail in practice, as the bundle of bougies are apt to cling together and all stick fast. When a very narrow stricture at two or three inches exists, with a second beyond, it is sometimes requisite to widen the anterior stricture with the fine urethrotome of Mr. Lund, sufficiently to allow the straight silver tube to be passed and open a way for the direct attack of the bougie on the hinder contraction.

When patient trial at more than one sitting has shown the hopelessness of getting flexible instruments past the obstruction—a conjuncture of great rarity—the finest silver catheter may be employed; No. $\frac{1}{2}$ and No. $\frac{1}{3}$ English being the smallest which retain sufficient rigidity to allow the point to be directed by the hand. The solid probe-pointed catheter No. $\frac{1}{2}$ through the curve, and No. 2 English (7 French) in the straight part, of Sir Henry Thompson, are very valuable instruments in skilful hands. But, as these instruments are almost as sharp as needles, a very small force suffices to drive their points through the wall of the urethra and create a false passage; and they should never be employed with the notion that they must be driven along the urethra, for such an attempt invariably lands them between the bladder and the rectum, or even in the rectum itself.

When, by any plan, an instrument has reached the bladder through these fine structures, it should at once be tied in, as, even if it be itself too fine to act as a tube, the urethra quickly widens around it, and in twenty-four hours will allow a larger one to replace it, or permit other methods of treatment.

2. *Gradual dilatation by continuous tying in* consists of keeping a flexible catheter, or filiform bougie if the narrowness of the stricture require it, day and night in the stricture; replacing it every forty-eight hours by a larger one, until the natural calibre of the urethra is restored to the strictured part. This replacement is needed, lest, being too loose in the urethra, the catheter slip out of the stricture, and so interrupt the process of dilatation. But the enlarging process is kept up quite as rapidly by a small catheter as by one which nearly fits the stricture. This process usually occupies from eight to twelve days. The method is easy, rapid, and safe. It requires three precautions. 1. The catheter should always be a loose fit; that is, two or three numbers smaller than the stricture. 2. The patient should be confined to his room, not necessarily in bed, but to avoid walking about, though I have known adventurous spirits who have gone to and fro the City daily during the process. 3. The catheter should not quite reach the bladder, but its beak should lie in the membranous part of the urethra, leaving the neck of the bladder free. When it is desired to draw off urine, the catheter is pushed into the bladder while the urine flows, to be again withdrawn and the end stopped by a little spigot when the bladder has been emptied. Flexible instruments are tied in place in several ways. The plan I adopt is to pass the catheter through the stricture till it has reached the bladder and urine escapes. I then withdraw the catheter till urine ceases to run, and tie tightly round the catheter, an inch or so beyond the meatus, a piece of silk or cotton twist, of which the ends are again knotted together about one inch from the catheter, then carried round the penis behind the glans and tied. The foreskin is then drawn forwards, the catheter shortened by cutting off the superfluous three or four inches, and the spigot put in.

The process that widens the stricture seems to be similar to that which goes on in parts where a seton or other foreign body has been placed. The tissue becomes swollen and succulent; its cells enlarge, and the intercellular spaces are crowded with leucocytes. The further disintegration and development of the tissue into pus quickly widen the space in which the foreign body lies. But the fibrous contraction is only temporarily altered in nature, not removed; and the width gained is seldom long maintained. When dilatation is slowly produced by tying in, there is probably a copious deposit of fibrous tissue; and, in such cases, rapid shrinkage is inevitable. When the expansion is quickly obtained, there is but a scanty production of stricture-tissue, and much of the contraction is muscular.

Continuous tying in has these disadvantages. 1. As just mentioned, it is in many cases followed by speedy recontraction of the stricture, so that the passage of a bougie of fair size, indispensable to maintain patency, becomes either impossible or so difficult that the patient abandons the use of his instrument, and soon reverts to the condition he was in before treatment. Referring to Mr. Davies's table, I find that three patients were treated by continuous tying in alone. In two cases, re-

lapse had begun when they were last heard of; of the third no intelligence had been obtained since he left hospital. In one of the three men, the stricture had been widened previously to his admission to hospital, once by interrupted passage of bougies, and twice by tying in catheters. After widening by interrupted passage, the stricture in four months had shrunk again to No. $\frac{1}{2}$ English. The immediate occasion of the patient's admission to University College Hospital was a strangulated hernia, caused by straining to pass urine. Herniotomy was performed, and the stricture dilated by tying in. At the last intelligence, four months afterwards, recontraction was already beginning. Also the previous histories of ten other cases, where gradual dilatation had been employed before they came to hospital, showed that shrinkage after tying in had been even more rapid than after simple stretching by passing bougies, six months being usually the length of time in which freedom in micturition is obtained by this method.

2. Again, some patients cannot support the constant presence of a catheter in the urethra for more than two or three days consecutively, even when the neck of the bladder is not continuously touched by the instrument, and the precautions already mentioned have been duly observed. In such cases, *malaise*, general febrile reaction, sometimes very severe, with considerable pain at the neck of the bladder, compel the removal of the catheter, either altogether or for three or four days, until the disturbance has subsided; in which time, however, much of the width gained has been lost.

Nevertheless, tying in may be employed in exceptional cases with advantage. These are (1) when time presses and it is important to drain the chronically distended bladder and relieve renal irritation; or (2), again, in cases where the irritable temperament of the patient causes much pain or shivering to follow each passage of the sound in simple dilatation. Such persons are, by the way, generally best treated by internal division. Tying in may also be employed for strictures of long standing, where there is also considerable renal disease. In such cases, the risk of a cutting operation in the urethra often outweighs the benefit of the greater relief which that method affords. From the foregoing, you may gather that tying in is never trustworthy for permanent relief; for it is followed by recontraction more rapidly than is any other form of dilatation.

3. Next come *forcible dilatation* and *divulsion*. Forcible dilatation differs from divulsion by tearing the fibres of the urethra at the strictured portion slowly asunder, instead of ripping them apart instantaneously. In principle, the methods are similar, and the permanent results much the same. Probably the immediate danger is less after forcible dilatation than after divulsion. For forcible dilatation, the best instrument with which I am acquainted is that of Sir Henry Thompson: a split sound, of which the halves, when close together, equal No. 12, but can be separated by a lever till they are equal to No. 26 or more. When used, the sound is first passed through the stricture; then the blades are slowly separated until, in the course of ten to fifteen minutes, the strictured part is stretched to the natural diameter of the urethra.

I have abandoned the use of both forcible dilatation and divulsion, mainly for their ill success. This is manifested, on the one hand, by the speedy shrinkage of the stretched or split tissue to its former narrowness, or even beyond its former narrowness; and, on the other, by the greater difficulty which ensues when a second course of treatment is undertaken. Some strictures—perhaps the majority—retain considerable elasticity. Those which have much of this quality are simply expanded for a few hours or days by the divulsor, and then resume their former narrowness. Certain others, situate at the bulb, develop a large amount of fibrous tissue. When this is torn or split asunder by the divulsor, a ragged rent is left, which, in healing, produces a new formation of fibrous tissue; so that, when sufficient time has elapsed (in two patients of Mr. Davies's tables, where Holt's method had been previously practised, retraction occurred in eighteen and five months respectively), a tighter stricture, with thicker and harder surrounding tissue than had been there before, has developed. Possibly the great successes which are announced to follow divulsion have occurred in those cases of stricture of no great duration, where a moderate contraction of the antescrotal part—near the orifice, for example—of which the existence is suspected by neither surgeon nor patient, has caused much spasmodic narrowing of the bulbo-membranous portion. Such a penile stricture is split across by the divulsor, which must be carried past it to reach the narrow bulbous stricture; and, this being divided, the spasmodic narrowing of the bulb is no longer produced, and the case is claimed as a cure of narrow bulbous stricture, when it is really one of a moderate antescrotal contraction.

Being once present when Holt's divulsor broke to pieces in the hands of a skilful operator, I was led to contrive a divulsor of simpler construction, in which the dangerous friction unavoidable in Holt's instru-

ment does not occur. The split sound, which is the guide to the splitting part of the apparatus, is also narrower than Holt's, and consequently will pass through a closer stricture. It consists of a slender sound the size of No. 7 French (No. 2 English), and a wedge with dove-tailed edges, that slides readily on the halves of the split sound, and thrusts them asunder with very small effort and no strain to the instrument. I have now added to it a concealed knife, and have thus converted it into a cutting instrument, the mode of action of which I will explain when speaking of internal urethrotomy.

4. *Urethrotomy* is practised from within and from without, the latter operation being one of high antiquity. The internal division of stricture, now that the locality and causes of urethral contractions and also the conditions necessary for proper performance of the operation are better understood, is gaining more general adoption. So much is the knife again rising into favour in the treatment of strictures—caustics having had their day, and splitting having now reached its autumnal season—that there is risk of the knife being applied too often and carried too deeply. In suitable cases and cautiously performed, internal urethrotomy is a safe procedure; while it has this crowning advantage, that it gives in all cases, so far as my knowledge goes, a period of relief from the stricture always measured by years, and often by a long tale of years.

Nevertheless, as you know, urethrotomy is applied to only a part of the cases of stricture which come here for treatment; so it is necessary to define the conditions of the patient or of the stricture which call for this operation. The conditions of the patient which favour internal urethrotomy are these. The first is youth. A man between twenty and thirty with stricture has seldom suffered long enough to have undergone much degeneration of his kidneys; that consequence of stricture is more frequent between fifty and sixty. A young man's stricture most commonly is a bridle or ring near the meatus, the deeper portion being not at all or only slightly affected. Again, a young man desires to lead a more active life, to enjoy its pleasures as well as undergo its toils; hence, he is more ready to submit to severe treatment to obtain complete relief from his stricture than is an elderly man who is satisfied if he obtains some relief from pain and danger. Lastly, a small number of persons cannot endure the retention of catheters nor the passage of instruments with sufficient frequency to procure dilatation of a narrow stricture. If pursued for more than three or four days, fever sets in, with rigors and vomiting, great pain in the perinæum and neck of the bladder, purulent, albuminous, even bloody urine—in short, all the conditions which, grouped together, are termed urethral fever. These complications of course require cessation of instrumental treatment until they have passed away. In such cases, the risk attending internal incision is less than that of any other plan open to the surgeon.

But the locality and form of the stricture, providing there be no forbidding degeneration of the kidneys, are generally the prevailing conditions for or against operation. First among strictures generally needing incision, are those *anterior to the peno-scrotal angle*. Strictures of this region are often of great elasticity, yielding before the bougie readily, and shrinking again after its withdrawal almost as readily. Even when not elastic, such strictures either contract very rapidly after gradual dilatation or do not widen beyond a certain extent, and attempts to pass this extent cause dangerous irritation. Again, many penile narrowings are "bridle" strictures, or strictures devoid of a large amount of fibrous development. Internal division of such cases has three advantages: (a) it obtains sufficient amplification of the stricture, if it be unyielding; (b) it renders subsequent shrinkage slow instead of rapid; and (c) incision in the antescrotal region very seldom excites dangerous constitutional disturbance.

Next, strictures at the *bulbous or bulbo-membranous region* are often of great thickness, composed of hard fibrous tissue that yields very slowly to the passage of bougies, and contracts speedily when so dilated. Incision may be safely practised in these cases also.

To revert to some of the assertions I have just made respecting internal incision: first, that subsequent shrinkage of a stricture is slower after incision than after gradual dilatation. On turning to Mr. Davies's tables, it appears that, of the thirty-two cases there noted, five were treated in hospital by passing bougies only; the strictures in three patients were equal to Nos. 7, 11, and 15 (French) respectively; in the remaining two, they were No. 3 (French). All but one, who left after only a few days' stay in hospital, were able to pass No. 22 (French) themselves when they left. Some of them in a few months, all in less than two years, reported their strictures to be much shrunk, the passage of a bougie with more or less regularity notwithstanding. One patient had even undergone a fresh course of treatment at the hands of a surgeon unconnected with the hospital. Again, ten of the remaining twenty-seven cases are reported to have been subjected to gradual dilatation either by passing or tying in catheters before reaching us—some of them

two or three times; yet their strictures on admission were narrow, most allowing only a filiform No. 2 or 3 (French) bougie to pass, and the largest not exceeding No. 7 (French) (2 English) in size. In two other cases, whose treatment in hospital was limited to continuous dilatation by tying in catheters, a similar short duration was noticed. When this interval of comfort, varying between a few months and one and three-quarter years, had elapsed, the contraction had so far returned that delay and straining during the act harassed the patient as before. If we turn to the account of the after-condition of the cases of internal urethrotomy, we find a much longer period of freedom from difficulty. In none of these cases, when they were last heard of, had difficult micturition returned, though in nearly all had some slight diminution of size taken place. From six patients, the last report was received more than a year after their operation; and in the rest, with one exception, more than six months after their operation. The latest report I received only three days ago from a patient who methodically reports himself every six months as being perfectly well—never in any difficulty in passing urine, but using his instrument regularly.

Thus far, I have been quoting only the cases in Mr. Davies's table; but I have a tolerably numerous account of patients operated on in former years who have enjoyed some years of freedom from symptoms. Two cases have come to my knowledge where the contraction after urethrotomy has called for further treatment, but their relapse may fairly be attributed to the non-passage of the bougie after the operation. On the other hand, I have intelligence of many others who remain well and free from urinary troubles without applying to a surgeon.

Next, I mentioned the fact that incision in the antescrotal region seldom causes dangerous constitutional disturbance. Had it not been for one case which occurred to me several years ago in these wards, I should have been tempted to use the word "never" instead of "seldom"; for, with that exception, I have never seen more than very trifling febrile disturbance, which passes off in a few hours, and commonly none at all results. In the patient alluded to, incision of a very tight stricture in the second inch was followed by erysipelas and sloughing at the part incised, leaving an obstinate penile fistula.

Again, I said that incision may be safely practised on strictures at the bulbo-membranous part when there is considerable development of fibrous stricture-tissue. Here I would remind you that, in some cases, much of the narrowing of the urethra at the perinæum is not permanent loss of elasticity, but reflex muscular contraction increasing a really moderate amount of fibrous stricture. Nay, fibrous stricture may be altogether wanting at the perinæum; and the contraction there entirely due to reflex spasm set up by a moderate antescrotal stricture. Under these circumstances, incision must be very cautiously applied, lest the vascular tissue surrounding the urethra at that part be deeply wounded. Hence, before operating upon a bulbo-membranous stricture, the condition of the penile urethra should be exactly ascertained, and the strictures which are nearly always to be found there properly divided before the narrowing at the bulb is attacked. If this be done, it sometimes happens that an apparently narrow stricture at that locality disappears altogether. This is one of my reasons for discarding all incisors which cut from behind forwards. They attack first the part which should be last incised. I have thought fit to return to this point, because it is one which I conceive to be of great importance, and not generally comprehended, that a moderately narrow stricture in the antescrotal portion—commonly the first inch—may cause a reflex muscular contraction at the bulb which clings to a bougie passing along the urethra, and hence causes the impression that the organic stricture is placed at the bulb, instead of much nearer to the surgeon's hand. Of course, strictures do develop at the bulb; further, in long-standing cases, the amount of fibrous development is often very great there. And, where there is considerable fibrous development, incision at the bulbo-membranous portion is followed by very little, if any, constitutional disturbance at this locality. Judged by such results alone, incision would be as safe and satisfactory a procedure as in the antescrotal part of the urethra. Unhappily, as our records show, considerable constitutional disturbance has followed incision of stricture in cases where the previous investigation discovered no special condition adverse to the operation. Of course, in some cases, the amount of vesical or renal disease is such that any operation on the urinary tract, however slight, may excite dangerous complication; but at this moment I am not speaking of such exhausted conditions. I mean cases where, gradual dilatation having failed to afford sufficient relief to the stricture, incision is employed with good prospect of success. Doubtless, such cases are rare; but they exist, and are more likely to be among subpubic strictures of scanty rather than of ample development; hence this accident will probably disappear from clinical observation as our knowledge of the locality of fibrous stricture is improved and a more general recognition of the varied nature of strictures at the bulbo-membranous portion obtains. In Mr. Davies's tables is

recorded a fatal case after internal urethrotomy in a patient with long-standing stricture terminating in complete retention for several hours before admission, during which interval several surgeons had introduced many instruments without reaching the bladder. After the bladder had been relieved and the patient restored by rest in bed and continuous drainage of his bladder for six days, the stricture (No. 2 French, No. ½ English) was divided. Pyæmia set in on the third day, and death followed on the tenth. We had thus an opportunity of examining the incision. This is the note taken by the surgical registrar, who made the *post mortem* examination. "Incision covered with adherent lymph. Bulb contained a firm dark clot, which did not extend beyond its investing fascia. No plugging of veins. Kidneys cirrhotic; ureters, bladder, and prostate healthy." The "cirrhotic" state of the kidney indicates advanced interstitial nephritis, and consequently dangerously impeded the circulation of blood through an organ that had lost much of its glandular tissue. The opportunity of examining the line of incision showed that, by employing the knife in the free manner usually recommended in theory, if not always carried out in practice, incision must be carried into the natural vascular tissue beyond the stricture; which vascular tissue has free communication with the periprostatic and iliac veins, from which blood is easily extravasated, and into which septic matters readily enter. Indeed, I suspect the reason why so little hesitation has yet arisen among the advocates of free incision is that, by the instruments they employ, they really cut much less than they conceive they divide. Maisonneuve's instrument is especially apt to work its way through a stricture, partly by cutting, partly by stretching; thus leaving the fibres only stretched capable of speedy recontraction. Possibly to overcome this fault, those who still employ it have widened the blade till it can cut for half an inch or more through tissue which cannot yield before it. But only very tough extensive strictures can be so treated safely; and they may often be safely cut even more deeply without exposing any vascular erectile tissue. Reybard, renowned nearly thirty years ago for the depth of his incisions, made, it is said, the blade of his knife appear in the perinæum before he was satisfied with the completeness of the division. This, coupled perhaps with the untoward consequences of such hardihood, helped to bring internal urethrotomy into a bad repute, which it has not yet quite shaken off.

I am aware that, in urging this necessity for letting the incision penetrate no deeper than the extent of the fibrous induration, I am running counter to the opinion of some eminent operators, who direct that incisions be made freely, if made at all. I especially disagree with that school of surgeons—more influential, perhaps, in America than in Europe—who urge that, unless the incision be carried even slightly beyond the induration into the healthy tissue, speedy recontraction of the stricture must always result; whereas, when the strictures are thoroughly severed, they assert that the new tissue which is formed in the gash cut by the knife has no contracting tendency, but forms a wide splice or "gusset", that henceforth affords a free passage to the urine, or to a full-sized sound whenever that may be introduced. In short, according to this view, strictures are curable in the precise meaning of the term. I confess that I demur to the statement, for two reasons. First, those who maintain it in England do not employ an instrument capable of ensuring complete division. Much of the stricture-tissue may remain undivided when either Civiale's or Maisonneuve's urethrotome is used. Their incisions are really more shallow than the operators believe; while those in America who teach the necessity for deep incisions, using an instrument which sets the parts on the stretch before the knife is applied to them, are also cautious to employ a blade which can only make a very shallow cut, and thus they probably do not pass far beyond the indurated tissue.

When speaking of internal division of stricture, a word on the question of cutting through the floor or the roof of the passage must not be omitted. Through the meatus, an incision injures the erectile tissue least at the floor. If it were possible to ascertain beforehand where the thickest formation of induration-tissue is placed, it would be well to cut through that, whether it be floor, roof, or sides; but that is not so. In penile strictures, probably one part is not more frequently attacked by induration than another, while the natural thickness of fibrous envelopment is probably slightly greater in the roof. If the septum between the corpus spongiosum and corpora cavernosa could be hit exactly, the cut should be made there; a difficulty that is not easily surmounted. Therefore, attention must be steadily directed to cutting through the fibrous tissue only, and not at all beyond the fibrous tissue, then it will matter little whether the knife traverse the floor or any other part. In the bulbo-membranous part, the induration is necessarily in the floor; hence incisions in that region are most safely carried along the floor. For this reason, I habitually incise in the floor; though occasionally, when I have only a limited incision to make near, not at, the meatus, I carry it in the mesial line along the roof.