THE CORRECT TECHNIQUE OF THE "INJECTION METHOD" OF TREATING HAEMORRHOIDS, AND ITS ESSENTIALS.

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THE treatment of haemorrhoids by interstitial injections, usually of carbolic acid, has a definite place and value when the right type of case is selected. Correct technique and sound clinical knowledge are essential for success, while faulty technique may cause very painful ill effects for which the treatment and not the doctor is usually erroneously blamed. It is not my intention to enter on a comparison of the surgical and injection methods of treatment. Most rectal surgeons agree that in some types of cases treatment by injection is especially indicated, and in some operation is contraindicated. I will assume for the purpose of this article that the treatment of the latter type of case is alone under discussion.

From the beginning I was much impressed with the good results to be obtained by injection treatment, and a lengthy experience both at St. Mark's Hospital and in private practice has convinced me that failure is nearly always due to faulty technique and lack of experience in the treatment of rectal complaints. The technique which I recommend includes the following procedures: (1) Preparation of patient; (2) position of patient; (3) arrangement of instruments, swabs, and lotions; (4) lighting arrangements; (5) external perianal examination; (6) digital examination; (7) gradual dilatation with rectal dilators; (8) examination with proctoscope or anoscope; (9) injection of haemorrhoids.

1. *Preparation of Patient.*—The patient should take a mild purgative (strong purgatives are to be avoided) the evening before the day of injection. If, on examining a patient before injection, the bowel is found to contain faeces, an enema should not be given—it is too messy—but a glycerin suppository should be inserted and the patient allowed to go to the water-closet, when the rectum will empty itself in a few minutes. If the rectum shows traces of faeces on subsequent examination with the proctoscope, it can be swabbed clean through the latter.

2. *Position of Patient.*—The left lateral position will be found suitable for all cases. It was at first my custom to examine the men in the knee-elbow position and the women in the left lateral, but I now employ the latter position for both sexes. With the patient in this position, the buttocks being well elevated by a large sandbag underneath the left hip, and the knees well drawn up, all the advantages of the knee-elbow position are obtained, and the sensitive patient is spared the embarrassment which the latter position frequently causes. An ordinary plain couch will suffice for purposes of examination and injection; the buttocks should come well over its edge. The injection is given by the doctor seated on a chair at the left side of the couch facing the buttocks.

3. *Arrangement of Instruments, Swabs, and Lotions.*—The instruments and other essentials should be laid out within easy reach of the hand and in the order in which they are likely to be needed; the necessary withdrawal of the proctoscope whilst getting up to fetch some instrument or dressing, and then its reinsertion, entails much extra discomfort for a nervous patient. All instruments should be sterilized before using. The instruments and other essentials necessary for the efficient carrying out of the injection treatment are:

(a) A proctoscope or rectal speculum. The proctoscope is a special rectal speculum provided with an obturator, and is made in sizes varying from 3 to 5 inches in length. When selecting one, it is important to see that there is no elevated ridge on its distal end at the point where it meets the head of the obturator, as this ridge frequently acts as a troublesome obstruction to the smooth passage of the proctoscope. The edge must not be sharp. If the proctoscope is to be used only for examining the rectum, the injections being carried out through the anoscope, it is best to use a proctoscope 5 inches in length, as a greater extent of bowel can then be examined. If the proctoscope is to be used both for examination and injection the best size is one 3 inches in length.

(b) An anoscope. The anoscope is an anal speculum $1\frac{1}{2}$ inches in length without the obturator; with the obturator in place the instrument should be 3 inches long. The advantages of the anoscope are: (1) When fully inserted the pile-bearing area comes exactly into the lumen; the commonest mistake in injecting, and one entailing most painful consequences—namely, injecting in the wrong position too low down—can thus be avoided. (2) The lumen being

larger than that of the proctoscope, a bigger field for injection is brought into view, and the exact size and number of the haemorrhoids present and the best site for injection can be more easily ascertained. The anoscope is not suitable for very fat patients.

(c) A syringe of the dental type with special needles; Messrs. Arnold and Sons (Bell and Croyden) have made to my specification an all-glass one graduated in minims.

(d) Rectal dilators. A metal set, hollowed out so that they fit one inside the other and thus take up little room, in a case, has been made for me by Messrs. Arnold and Sons (Bell and Croyden).

(e) The solution for injection. That which I always employ, and which I have found most efficacious, is the following: Liquefied carbolic acid 48 minims, glycerin 2 drachms, distilled water 2 drachms; mix (this is a 20 per cent. solution of carbolic acid). If there should be pain after the first injection with the above solution, a 15 per cent. or 10 per cent. solution should be used for the next one, after first examining the patient to exclude all other possible causes of pain. I have tried various other solutions, but I now employ this one exclusively.

(f) A long forceps for the application of swabs to the interior of the rectum.

(g) A haemostatic clamp in case of troublesome bleeding. I have been fortunate up to the present in not having to use this.

(h) A basin containing a weak antiseptic solution (1 in 2,000 biniodide), at about body temperature, in which to heat the proctoscope or other instruments, and in which are placed swabs for cleaning the rectum and haemorrhoids before injection.

(i) Thin rubber finger-cots, cotton-wool swabs, vaseline, tray for soiled swabs and instruments, scissors, and flexible probe.

(j) Morphine or cocaine and adrenaline suppositories should be at hand to deal with any complications that may arise.

4. *Lighting Arrangements.*—Good illumination is essential. An electric head-lamp or light from an electric bulb mounted on a stand will suffice.

5. *External Perianal Examination.*—Before exploring the interior of the rectum the perianal region should be examined for any abnormal condition which may contraindicate or complicate treatment of the piles. The commonest pathological conditions met with in this region are:

(a) External thrombosed and inflamed haemorrhoids.

(b) Skin-tags or cutaneous piles—bits of hypertrophied skin due to overstretching of the perianal skin from repeated prolapse of internal piles, or due to former attacks of external piles, or the result of a previous surgical operation on internal piles.

(c) Sentinel pile—really an inflamed and oedematous skin-tag with usually a fissure at its base.

(d) The openings of fistulae.

(e) Venereal lesions, such as gonorrhoeal warts and syphilitic condylomata.

(f) Ischio-rectal and perianal abscess.

(g) Prolapsed internal piles, prolapsed polypi, prolapsed enlarged anal papillae, and prolapse of the rectum. Prolapsed piles should always be returned into the bowel before injection; they should first be bathed with weak antiseptic and covered with vaseline.

(h) Fissures. Most often the fissure will be found just inside the anal opening posteriorly, and when present is usually so painful that not only is it impossible to pass the proctoscope but even digital examination is rarely possible. If the fissure is of recent origin, palliative treatment until it heals will be necessary before injection can be carried out; if the fissure is of old standing, it is best to advise operation for the fissure and haemorrhoids together, a course which is also to be advised when fistulae and polypi are present.

6. *Digital Examination.*—The object of digital examination is to ascertain the presence of pathological conditions in the anal canal and interior of the rectum, and not for the purpose of diagnosing haemorrhoids; it is almost impossible to diagnose even very large haemorrhoids accurately with the finger. Most rectal lesions—for example, fistula openings, ulcer, fissure, polypi, etc.—are found in the lowest inch and a half of the bowel—that is, in the anal canal. A thin rubber finger-cot, well lubricated with vaseline, should be placed on the examining index finger; the anal canal and exterior of the anus should also be lubricated. It is advisable to use plenty of lubricant when making any form of ano-rectal examination, as otherwise cracking or fissuring of the anal lining and margin is liable to result. Having examined the anal canal, the finger should then be passed as high up as possible into the rectum. Cancerous and other growths can often be detected by this method. Displacements of the uterus should be excluded before diagnosing rectal growths in women by digital examination.

7. *Gradual Dilatation with Rectal Dilators.*—This is a procedure which I have not seen recommended by others in this country, but its adoption will be found most advisable. In some cases gradual dilatation is not necessary, but for routine purposes, especially when examining a nervous patient for the first time, it is always advisable to pass first one dilator of a calibre smaller than the proctoscope, as it greatly facilitates the passing of the latter. An even more important point in favour of gradual dilatation before injection is that it causes diminution or cessation of bleeding from piles. In several cases where haemorrhage was one of the most troublesome symptoms, and where on examination the sphincters were found to be very tight, I have only dilated the sphincters and

did not inject any of the haemorrhoids at the first consultation. I found at a subsequent visit that the haemorrhage had considerably diminished, and in some cases had ceased. This result is not surprising when it is remembered that forcible division of the sphincters with the fingers under anaesthesia is often practised by many surgeons as the sole treatment for small piles where haemorrhage is very troublesome, and that haemorrhage seldom persists after this treatment. It was the recognition of this fact that led me to adopt dilatation as a help to injection in the treatment of bleeding piles.

The beneficial effects of dilatation are probably brought about as follows. In any ano-rectal condition where discomfort and pain are prominent symptoms, spasm of the internal and external sphincter ani muscles becomes marked, and the expulsive power of the rectal and other muscles used in defaecation becomes reflexly diminished. As a result the bowel never empties itself completely and faeces accumulate, causing pressure on the piles and haemorrhage. Dilatation overcomes the spasm of the sphincters, the bowels act more freely, and pressure is thus removed from the varicose condition. Dilatation gives the best results when the piles are of the venous type, and permanent cessation of bleeding with complete disappearance of the haemorrhoids sometimes results from dilatation alone when veins only are present in the haemorrhoids, and when the latter are small. All internal haemorrhoids begin as venous piles; it is only in the later stages that arteries and capillaries enter. When arteries or capillaries are the principal vessels in the haemorrhoids, dilatation may still cause cessation or diminution of bleeding, but the effects are only temporary, as in these cases it is the veins in the piles that are principally relieved, the arterial structures being affected to a much lesser extent. Sometimes the original veins become thickened, thrombosed, or may even become obliterated, so that arteries or capillaries are practically the only vessels left in the haemorrhoids. Where systematic gradual dilatation is not employed, it is probable that it is the dilatation caused by the passing of the proctoscope which is largely responsible for the rapid temporary disappearance of the bleeding which frequently results after the first injection when only one or two piles have been injected. Experience, however, has taught me that the haemorrhage would soon return in most cases if the injections were discontinued before the disappearance of all the piles. In a few very rare cases dilatation fails to give satisfactory results. When gradual dilatation is carried out with the object of relieving haemorrhage and overcoming spasm of the sphincters, dilators up to a size larger than the proctoscope should be passed.

8. *Examination with Proctoscope.*—The proctoscope, previously sterilized, should be dipped in weak antiseptic lotion warmed to body temperature, well lubricated with vaseline, and gently passed to its full length into the rectum; the obturator should then be withdrawn. Two points now present themselves for consideration:

(a) Examination of interior of rectum to exclude any other abnormal conditions that may coexist with haemorrhoids, such as fistulae, polypi, ulcers, fissures, benign and malignant growths. The necessity of a thorough examination of the rectum in treating haemorrhoids or any other ano-rectal lesion cannot be too strongly emphasized, as these lesions are frequently only a symptom of or may coexist with some more serious trouble, such as cancer of the bowel. The lower bowel (rectum and sigmoid) is one of the commonest sites in the body for the occurrence of cancer. Unfortunately, however, almost every complaint of the anus and rectum is generally attributed by the public to piles, and it is a sound axiom of rectal practice that "Every patient who complains of bleeding from the bowel should be suspected of suffering from a cancerous growth until a careful examination has proved the suspicion to be groundless." In cases of suspected lesions higher up the bowel the sigmoidoscope should be used for purposes of diagnosis.

(b) Accurate diagnosis of the haemorrhoids, their number and position in the bowel. To ensure an exact diagnosis it is well to remember that the anal canal is about 1 to 1½ inches long, and that the pile-bearing area—that is, the site of origin of internal piles—is situated at the junction of the rectum and anal canal just above the sinuses of Morgagni and anal papillae; external piles occur below this area. Thus about 1 to 1½ inches must be traversed before the true pile-bearing area is reached and before the haemorrhoids are injected. The anal canal, being richly supplied with nerves, is very sensitive, whilst the area above the upper limit of the anal canal—that is, above the sinuses of Morgagni and anal papillae—is almost insensitive for injection purposes. There should therefore be no injecting in the lower area if pain is to be avoided, and this latter complication should never occur if the anoscope, and not the proctoscope, is used. The anoscope is 1½ inches long, and when in position the actual pile-bearing area prolapses into the lumen; it may sometimes be necessary to withdraw the anoscope half an inch

before the piles prolapse into its lumen. The anal canal is lined by modified skin which merges into mucous membrane at its junction with the rectum proper. It is beneath this anal lining that external haemorrhoids occur, and they are due to dilatation and varicosity in its veins. External piles are covered with skin and internal piles are covered with mucous membrane; there should therefore be no difficulty in distinguishing between them. External piles cause no symptoms, and are scarcely visible until they become thrombosed and inflamed; internal piles are plainly visible on examining with the proctoscope, and except in their late stages are seldom thrombosed and inflamed. External thrombosed and inflamed or "blind" piles appear as black or blue-black hard swellings at the edge of the anus, and are usually very painful and tender. In no circumstances should external haemorrhoids or any structures covered by true skin be injected, or sepsis and much pain may result. The best treatment for external thrombosed piles is to snip the top off under aseptic conditions with a scissors and turn out the clot.

9. *Injection of the Piles.*—The following points present themselves for especial consideration:

(a) Number of haemorrhoids to be injected at each sitting. For routine treatment it is advisable that not more than two haemorrhoids should be injected at one sitting. If the haemorrhoids are very large, only one should be injected; experience will teach when it is wise to inject more than two. A "large haemorrhoid" can be described as being the size of a medium-sized chestnut; anything above this size can be classified as "very large." A "small haemorrhoid" I would describe as anything smaller than and up to the size of an ordinary raspberry. "Medium-sized haemorrhoids" would be anything between the above-mentioned standards. Some doctors inject all the haemorrhoids at one sitting and get excellent results in many cases, but they are experienced proctologists, and long practice has taught them the types of case suitable, the amount of fluid to be injected (this frequently varies for each haemorrhoid to be injected), and many other points which only experience can teach. Mr. Morley, who has had much success with injections, advises and practises injection of all the haemorrhoids visible at each consultation. Despite the excellent results obtained by some who adopt this procedure, it is probable that the results would be even better still, and the few cases of severe pain, sloughing, and irritation of the bladder which are reported when all the haemorrhoids are injected together would be unknown or exceedingly rare, if not more than two or three were injected at a time. Moreover, when all the piles are injected together, a feeling of heat and heaviness or aching usually persists for several hours, and may cause loss of sleep. I consider this a complication, especially since this trouble can usually be avoided by injecting only two or three haemorrhoids at one time. Pain, varying in intensity from slight to very great, and sloughing, are much more liable to occur when all the piles are injected at one sitting. Since giving up this latter practice I have not had a case where "great pain" was an after-effect, and it is most unusual to find that a patient even complains of discomfort. Mr. Eadie, who has also had much experience and success with this form of treatment, injects not more than three at one time, and this is a procedure I myself usually adopt. The advantages claimed for the injection of all the haemorrhoids together are that fewer consultations will be necessary and that symptoms disappear quicker—distinctly attractive points for patients who live at a distance and to whom the trouble and expense of frequent journeys may be of much moment. When in doubt, however, as to whether to inject all or only two haemorrhoids, I think one should be guided principally by the consideration of what procedure is least likely to cause results, such as pain, which would necessitate the patient having to lie up. This complication is distinctly awkward when the patient lives at a distance. When all the haemorrhoids are injected together, it is advisable to have an interval of one week between injections; when not more than three are injected, an interval of three clear days between injections will suffice, so that although more injections will be necessary in the latter case, the time elapsing until cure is complete will be the same in each instance. The advantages claimed for injecting all at one sitting are thus only superficially attractive. The average patient would willingly elect to attend for a few extra injections rather than run even a slight added risk of painful complications.

(b) Selection of haemorrhoids. The lower piles should always be first injected. If the upper ones are selected and it is then found necessary to inject the lower at the same sitting, oozing from those first injected may obscure the latter.

(c) Site of injection. The haemorrhoids having been swabbed with antiseptic lotion, the needle is thrust into the centre or apex of the selected pile. If the pile is a large one, the needle, which is about half an inch long, should be plunged in right up to the shoulder; if the pile is a small one, the needle should

not be thrust fully in, but care should be taken not to inject too superficially, or sloughing of the mucous membrane covering the pile will result: practice alone will teach the correct depth. I usually allow a drop of carbolic solution from the syringe to fall as an antiseptic on the spot at which I intend the needle to enter and then puncture through it. I prefer this to my previous practice of touching the pile at the point of entry with pure carbolic acid, as the latter is liable to cause slight sloughing and discomfort. It is doubtful, indeed, if either procedure is of much advantage provided that haemorrhoids are well swabbed with biniodide lotion. When very large haemorrhoids are injected and their disappearance seems to be slow, it is a good plan to make the later injections well above the point of entry of the original one and the last ones slightly below, being careful not to inject too low, or too much fluid.

(d) The amount of fluid to be injected. This depends on the size of the pile, and can only be learnt by experience. A safe rule is to inject 5 minims for each large haemorrhoid and 3 minims for smaller ones: when in doubt, always inject the lesser amount. I have on occasions injected 10 minims with no ill result. If when the needle is inserted the patient complains of pain, and the pain increases when a drop of fluid is injected, it is fairly certain that the injection is being made too low down, and the needle should be withdrawn immediately. The anal canal is richly supplied with nerves and is therefore very sensitive; moreover, the tissue lining the anal canal is cutaneous in character, and should the carbolic solution be injected beneath the anal lining severe pain lasting many days, and possibly abscess with subsequent fistula formation, may result. The real pile-bearing area just above the papillae is almost insensitive and injections here are scarcely felt. The carbolic solution should be injected slowly drop by drop, and the needle should not be withdrawn from the pile until half to one minute has elapsed. If the needle is withdrawn immediately after injection, some blood will escape and with it much of the injected fluid. The pile swells up after injection and assumes a whitish colour; at least this is what usually happens and is what one wishes to see, because it is a sure sign that the injection has been successfully effected. Should this whitish appearance not result, however, as not infrequently happens, it does not follow that the injection will be unsuccessful. On no account should a further amount of fluid be injected in the hope of producing this white appearance of the pile. The same procedure is adopted for each pile: should pain result from any injection, further treatment should be deferred till all pain has disappeared.

How many Injections should be given?

Injections should be given until all troublesome symptoms have disappeared and there is no prolapse into the speculum, even when the patient coughs. It is seldom that more than six visits for treatment are necessary; frequently two or three are sufficient, but it naturally depends on the number of haemorrhoids present. It is probable that when experienced practitioners do not get completely satisfactory results it is because they have not given enough injections to the larger haemorrhoids. One should not take the patient's word that he is cured because bleeding and obvious prolapse have disappeared; proctoscopic examination as indicated above is the real test of cure. If any trace of the haemorrhoids is left, recurrence is most likely to happen.

Contraindications to Treatment.

Haemophilia is practically the only contraindication to the treatment of "uncomplicated" haemorrhoids by injection. Piles complicated by the presence of fistulae, fissure, polypi, prolapse of rectal wall, or any other abnormal rectal conditions which may need operative treatment, should be removed by operation (the ligature operation for choice) at the same time that the latter conditions are being treated. Patients suffering from cirrhosis of the liver, nephritis, cardiac disease, abdominal tumours, enlarged prostate, displacement of the uterus, and constipation, frequently suffer from piles, and these complaints should be remedied or relieved as much as possible before treatment of the haemorrhoids can be successful.

Complications.

When the treatment is properly carried out only one complication is liable to occur, and even this is not due to the treatment, but to failure of the patient to carry out instructions after injection. This complication is prolapse of the piles with subsequent strangulation and sloughing, and it occurs as follows: after injection the piles swell up and are liable to prolapse; when prolapsed, if they are not pressed

back immediately into the bowel, the sphincter is liable to contract, preventing their return and causing them to become strangulated and sloughed. The patient should always be warned after each injection that prolapse is likely to occur, and that, in the event of it happening, the haemorrhoids should be covered with vaseline and pressed back into the rectum. Neglect to observe this precaution causes the very painful complication mentioned above. Other complications which may occur on rare occasions, and which are nearly always due to faulty technique, are:

(a) *Pain.*—The causes of pain are: (1) thrombosis; (2) injecting too much fluid, or using too strong solution, thus causing sloughing and thrombosis; (3) injecting too low down in the anal canal; (4) rough digital manipulation causing fissure; (5) prolapse and strangulation of the piles; (6) injection of inflamed piles. When piles are inflamed injection should be deferred until the inflammation has subsided.

(b) *Sloughing.*—This is usually due to injecting too superficially, or injecting too much, or a too strong solution. Part of the mucous membrane covering the pile, or the whole pile itself, may slough away, and considerable pain result, depending upon the extent of sloughing, which may last several days, but is usually the only ill effect. Sedative suppositories or sedative enemata and local cold or warm applications should be employed to deal with any troublesome ano-rectal pain.

(c) *Abscess Formation.*—I have never had a case of sepsis resulting from injection in my own practice, but I have seen a few in the practices of some general practitioners who were attempting the treatment for the first time. In most of these cases the haemorrhoids had been injected too low down; in two cases skin-tags had been injected, and in another an attempt had been made to inject a thrombosed external pile. Perianal abscess of varying size resulted in each case, and the condition was very painful and distressing. These unfortunate results were obviously due to gross errors of technique.

(d) *Haemorrhage.*—I have fortunately never encountered, in several thousand injections, a single case of troublesome bleeding as the result of injection, but on a few occasions haemorrhage has continued for some minutes. Formerly I used to insert a suppository of adrenaline in such cases, but I have now abandoned this practice; I find it unnecessary, as bleeding usually stops spontaneously in a few minutes. The patient should not, however, be allowed to leave until one is sure all bleeding has ceased. Should a case be encountered in which haemorrhage persists despite the use of adrenaline, the bleeding point should be examined through the speculum and a haemostatic clamp applied for a few minutes. The type of bleeding (oozing, flowing, or spurting) depends on whether capillaries, veins, or arteries predominate in the pile.

(e) *Frequency of Micturition and Slight Pain in the Genito-urinary Tract.*—This is probably due to irritation of the prostate and urethra by the carbolic injection. I now make it a practice never to inject all the haemorrhoids in this region at one sitting, and since adopting this procedure I have not encountered the above-mentioned complications. Complete retention of urine after surgical operation on piles is not an infrequent complication, but I have never seen nor heard of this occurring from injection.

Manner in which Injections cause the Disappearance of Haemorrhoids.

The carbolic acid sets up a mild inflammation resulting in the formation of fibrous tissue, and the latter by contraction eventually causes gradual occlusion of the blood vessels, thus cutting off the blood supply to the pile. It is most probable that coagulation takes place within the vessels of the haemorrhoids during this gradual process of occlusion, and this coagulation is probably aided by a mild phlebitis set up by the solution. Sometimes the carbolic solution, instead of setting up a mild inflammation, gives rise to very acute inflammatory changes. When this occurs the coagulation necrosis or thrombosis in the vessels becomes most marked and pain ensues, varying in intensity according to the degree of inflammation. This complication is usually

due to injecting too much or a too strong solution. Except for the pain and discomfort I have never known any other complication arise as the result of thrombosis, nor have I heard of any in the practices of other doctors. Embolism and empyema are theoretically liable to occur, but happily in practice they do not happen, or only with great rarity.

What Type of Case is Suitable for the Injection Treatment?

There is much divergence of opinion on this point, and I can only give my own experience and method of classification. For purposes of injection I divide haemorrhoids into three classes. (1) Those in which I expect and usually obtain a completely successful result. Under this heading I include every case of internal piles, irrespective of size and extent of haemorrhage, provided that they are uncomplicated by fissure, fistula, sloughing, ulceration, prolapse of normal rectal mucous membrane, and are not markedly fibrous or polypoid. (2) Those where as a rule only partial success is obtainable although occasionally a completely successful result may ensue. By partial success is meant the disappearance of troublesome symptoms, such as bleeding, but prolapse may still exist to some extent. Under this heading I class partly fibrosed piles, haemorrhoids complicated with varying degrees of prolapse of the normal rectal mucous membrane, and those which from frequent prolapse have dragged the cutaneous lining of the anal canal down with them, the latter covering the lower part of the prolapsed pile like a cowl; when seen for the first time they may be mistaken for a polypus. Care is necessary in treating these two latter types of haemorrhoids, since there is danger of the fluid spreading under the skin if the injection is made low. In the treatment of this latter type of case the complication of sepsis (perianal abscess) is most likely to occur, and, unless the patient strongly objects, it is probably best to advise operation, as satisfactory results from injecting this kind of haemorrhoid are uncertain. (3) Those cases in which injections should never be attempted and for which surgical operation alone should be advised—for example, gangrenous, ulcerated, and sloughing piles, haemorrhoids almost or completely fibrosed, and those complicated by any other abnormal conditions for which operation will be necessary, such as chronic fissure, fistulae, polypi, and benign or malignant growths. As an operation will be necessary to remedy these conditions, the haemorrhoids should be operated on at the same time.

Instructions to Patient.

During treatment a daily action of bowels is essential, and a gentle laxative should be taken daily, if necessary, to ensure that the motions will be soft. The patient need not lie up after injection, and may carry on his usual routine work, but strenuous exercise such as cycling, horse-riding, or dancing should not be indulged in on the day of injection. Black coffee and meals immediately after injection should not be taken. Alcohol should be avoided or only used very sparingly. When treatment is completed the habit of regular daily evacuation of the bowels at a fixed hour should be advised. Straining at stool should be avoided and a mild laxative taken regularly if necessary.

I have described the technique of injection in detail as it is intended to be helpful to those practitioners who are employing this method of treatment for the first time; it is only by great attention to detail that successful results can be assured and ill effects avoided. Although a simple matter to those accustomed to ano-rectal work and only taking a few minutes to accomplish, yet for the beginner the difficulties attending the acquisition of the special technique attaching to the practice of ano-rectal work are similar to those encountered in other specialties, such as ophthalmology. It is advisable, therefore, that as much practice as possible under skilled tuition in the out-patient department of a general or special hospital should be obtained before attempting injection in private practice.

Messrs. Arnold and Sons (Bell and Croyden) have made to my specification "an outfit for the injection treatment of haemorrhoids" which contains everything necessary for the actual injection and for dealing with any complications that may arise.

**A Lecture
ON
BRAIN AND MIND.***

BY

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BETWEEN the primitive type of central nervous system, with its purposeful reflex unconscious actions, as seen in the earthworm, and the highly complex brain of man, with its manifestations of speech, thought, reasoning, delayed reaction to the stimulus, memory, and so on, there is an immense gulf. So much so, indeed, that it is not uncommon to find the human mind spoken of as though it were something which had no physical basis. The truth is that all mental phenomena depend strictly on physical construction, and that the elementary basis of such construction is always the neuron.

The nervous system is everywhere built up of a series of long conducting neurons, connected by a series of shorter neurons. The former comprise the receptor and effector neurons, the latter the internuncial. Medical and physiological attention has been chiefly devoted to the long conducting neurons, because lesions occurring therein have been fairly obvious and are of everyday frequency. In the study of the phenomena of mind and its aberrations it is, however, the short internuncial neurons which become of supreme importance. In the human cerebrum a sufficient number of such neurons are massed together to give those special reactions to the environment which we term "mind"; all mental phenomena are entirely conditioned by a highly complex series of neurons linked together in series of arcs.

Structural Elements of a Neuronic Arc.

Neurons are always linked together, for functional purposes, in neuronic arcs. A neuronic arc, of the simple type found in the segments of the earthworm, consists of:

- (1) A sensitive receiving organ (receptor or sense organ).
- (2) A conductor—that is, a receptor, sensory, or afferent neuron, which transmits the stimulus received in the form of a nerve impulse in an inward or central direction.
- (3) Short adjutor internuncial neurons; usually limited to the grey matter of the central nervous system, and found, in the case of the earthworm, in the neuropile of each segment, and, in the case of man, in the association areas of the human brain.
- (4) A second conductor—that is, an effector, motor, or efferent neuron, which transmits the nerve impulse in an outward or peripheral direction to—
- (5) The effector apparatus, which comprises the muscles, glands, or other organs of response, and the terminals of the efferent nerves upon them.

In the earthworm these elements of a neuronic arc are found in every segment. The receptor or sense organ is in the cuticle. When suitably stimulated it causes the receptor neuron to transmit a nerve impulse to the neuropile within the ganglion of the segment. The impulse is then conveyed to the internuncial neurons, and may pass thence in one of two directions. Assuming for the moment that the impulse is confined to the segment concerned, then the effector neuron is aroused to a discharge of nerve energy, and so the effector apparatus—the muscle of the segment—is stimulated to contract, and there is thus a direct reflex response to the original stimulus. Such an action is an unconscious purposeful reflex action.

In the common earthworm there is no "brain." The so-called "end-brain" of the earthworm is merely a fusion of certain ganglia, which dominate the local activities of the several segments and enable the animal to react, as a whole, to the external and internal bodily stimuli. The histological construction of this "end-brain" of the earthworm does not differ structurally from that of the neuropile of the segments, except in so far as it contains a larger number of integrating internuncial neurons.

* The lecture was delivered last year as an introduction to a course of neurology in the University of Melbourne, and has been slightly curtailed for publication.