ANO-RECTAL FISTULÆ.

By W. ERNEST MILES, F.R.C.S., Hon.F.R.C.S.I., Hon.F.A.C.S.

(*Foreign Associate of the French Academy of Surgery; Consulting Surgeon to the Cancer Hospital; Surgeon to the Gordon Hospital for Diseases of the Rectum.*)

Ano-rectal fistulæ present both the simplest and the most intricate problems that may confront the surgeon when he undertakes their surgical treatment. Fortunately the great majority can readily be cured by a simple surgical procedure but from time to time instances crop up which, from their complicated nature, tax the ingenuity and skill of the operator to the utmost and even then his efforts may fail to effect a complete cure. It is in such circumstances that a patient may be well advised to continue to endure the discomfort of a discharging sinus rather than run the risk of the permanent loss of control over the contents of the rectum that may result from repeated and extensive operations.

Ætiology.

With the exception of fistulæ produced by penetrating wounds from without and of those resulting from carcinoma or fibrous stricture of the rectum, every ano-rectal fistula is preceded by an abscess which is the outcome of infection by micro-organisms conveyed to the tissues, in which the abscess forms, chiefly by means of the lymphatics. Cultures made from the pus in such abscesses reveal that the organisms concerned are, staphylococci, streptococci, the *Bacillus coli communis*, the *Bacillus proteus* and occasionally the tubercle bacillus.

In the majority of cases the septic process starts in a lesion situated either in the anal canal or in the lower half of the rectal ampulla. The lesions usually responsible are, a thrombosed internal pile, local extravasation of blood in the submucosa, fissure at the anal margin, a torn down anal valve, laceration of the pedicle of a polypus, an ulcerated surface in a sinus of Morgagni, a suppurating ano-rectal gland and puncture or laceration of the mucosa either by small fragments of bone which have been swallowed or by the needle of a syringe employed in the treatment of internal hæmorrhoids by the injection method.

It must not be assumed, however, that every lesion occurring in the terminal portion of the rectum necessarily becomes infected and terminates in suppuration because the majority run their course without giving rise to a fistula.

Although the majority of abscesses met with in the terminal rectum or its immediate vicinity are due to infection occurring within the rectum, there is no doubt that occasionally peri-rectal suppuration is due to micro-organisms gaining access to the tissues by means of the blood stream. For instance, the majority of ischio-rectal abscesses are associated with a lesion in the anal canal, but there are instances where no lesion of any kind can be discerned. Whether infection takes place locally or through the blood-stream, the result is the same, the production of an infective lymphangitis or phlebitis terminating in local suppuration. So soon as an abscess has been formed it extends along the lines of least resistance, the pus being guided between planes of fascia and passing round those blood vessels which are of sufficient size to resist thrombosis and dissolution. Reference to the anatomy of the environments of the terminal rectum, with its numerous planes of more or less dense connective tissue, joining and intersecting one another, readily explains the circuitous route by which the pus reaches the

skin surface or the interior of the bowel in order to find an exit. The route taken by the pus varies according to the anatomical site of the abscess, but in each type the pus pursues a regular and definite course which can be accurately mapped out and studied. So soon as the pus has found an exit either in the bowel or through the skin, a fistula has been established, incomplete when the discharge has taken place only in the rectum or only through the skin and complete when an exit has been made in both situations.

The sequence of events therefore which lead up to the establishment of an ano-rectal fistula in the majority of instances is as follows: (a) appearance of an initial lesion; (b) septic lymphangitis or phlebitis as the result of infection by micro-organisms; (c) suppuration eventuating in the formation of a localized abscess; (d) evacuation of the pus either into the bowel or through the skin or in both situations, thus giving rise to (1) an incomplete or (2) a complete fistula.

Classification.

It is usual to divide ano-rectal fistulæ into three varieties: (a) the complete fistula in which there is an opening upon the skin surface in the neighbourhood of the anus and also one on the mucous surface of the bowel; (b) the blind external fistula in which there is an opening on the skin surface and none in the bowel; and (c) blind internal fistula in which there is an opening in the bowel and none on the skin surface. Some authors describe a fourth variety under the term horse-shoe fistula in which the fistulous track extends upon both sides of the rectum, but since the abscess giving rise to the fistula is primarily confined to one side only the extension to the opposite side should be regarded as an offshoot from the original abscess cavity and therefore the resulting fistula should not be regarded as constituting a separate variety.

The objection to this universally adopted classification of ano-rectal fistulæ is that it conveys the impression that they are varieties of a single type differing only in degree, and therefore equally amenable to treatment by the simple surgical procedure of laying open the fistulous track completely from the external opening to the internal opening and allowing the resulting wound to heal progressively from the bottom. There is no doubt that many fistulæ can be completely cured by this simple procedure, and yet it frequently happens that when carried out in some instances disastrous results ensue as the result of loss of control over the anal outlet. The explanation of these widely divergent results is that there are several types of fistulæ differing in the anatomical relationship of the track to the various muscles controlling the anal outlet. Every fistula is preceded by an abscess and the main track of the fistula is the contracted but unobliterated original abscess cavity. The anatomical site of the original abscess, therefore, determines the type of the fistula. The abscesses which precede fistula formation are the result of a septic focus in the terminal portion of the rectum, which extends by means of the lymphatics. The lymphatic system of the rectum consists of two plexuses, the submucous and the intermuscular, the efferents from which communicate with (1) the lymph sinus of the rectum, a space existing between the external muscular coat of the rectum and the peri-rectal fatty tissue, and (2) the subcutaneous peri-anal lymphatics. The efferents from the anal canal also pass through the fatty tissue of the ischio-rectal fossa on their way to Alcock's canal. As the result of sepsis within the rectum an abscess may form in any of the above situations, and since the anatomical site of the abscess determines the type of the

resulting fistula, the following classification of ano-rectal fistulæ seems to be anatomically advisable:—

- (a) The subcutaneous.
- (b) The submucous.
- (c) The intermuscular (between the muscular coats).
- (d) The para-rectal (situated in the lymphatic sinus).
- (e) The sub-sphincteric.
- (f) The ischio-rectal.

Each of these types may present incomplete, complete and bilateral varieties.

Differential Diagnosis.

It is of the utmost importance that the particular type of a fistula should be recognized before operative measures are adopted. The position of the primary external opening and especially its relationship to the internal opening provide useful information for arriving at an opinion. Similarly, the direction taken by the main track of the fistula, and its position in relation to the musculature of the terminal portion of the rectum, are points that help in arriving at a correct conclusion.

A complete fistula presents four features of interest, namely: (1) the external opening, (2) the internal opening, (3) the main track, and (4) the offshoots or extensions from the main track.

(1) **The External Opening.** A great deal of information can be obtained in regard to the probable type and nature of a fistula by observing the size, position and number of the fistulous apertures, to be seen in the perineal region. As a general rule, if the opening is small and contracted, and especially if it is situated within an inch of the anal verge, the fistula is probably subcutaneous in type. Should the opening be large, irregular in shape with undermined edges, and especially if the surrounding skin is of a reddish-purple hue, the fistula is most probably tuberculous in origin. When the opening is surmounted by a tuft of granulation tissue such as is often observed at the orifice of a sinus leading down to carious bone, a deeply seated fistula such as the ischio-rectal or the para-rectal is indicated. Should the opening be situated close to the anal verge or within half an inch of it, the fistula is invariably of the submucous type. When an opening is situated in the anterior part of the perineum and is nearer to the bulb of the urethra than to the anus and especially if it is close to the middle line, a urethral fistula should be suspected and steps should be taken to ascertain whether a stricture of the urethra exists. An opening situated in the posterior part of the perineum at the level of the tip of the coccyx and about an inch distant from the middle line is suggestive of the point of issue of a retro-rectal abscess. An opening situated in the middle line between the tip of the coccyx and the anal margin is probably the vent for a suppurating retro-rectal dermoid cyst. Lastly, the presence of several external openings is an indication of the existence of offshoots from the main track, some of which may terminate in a cul-de-sac. It is important therefore, under such circumstances, that a careful search be made for offshoots which have not found an outlet on the skin surface when such fistulæ are being operated upon.

Although a great many ano-rectal fistulæ have only one external opening, multiple openings are the rule rather than the exception in those of the ischio-rectal type. In these the internal opening is situated opposite the interval between the sphincters and is often of large size. When the internal opening is large, sometimes large enough to admit the tip of the index finger, fæcal matter is apt to enter it when an action of the bowels takes place, thus provoking acute inflammation along the main track of the fistula. As the result of septic lymphangitis secondary abscesses are formed in the vicinity of the main track. These abscesses eventually extend to the skin surface and open there, forming secondary openings. The original external opening is known as the primary opening and indicates the termination of the main track of the fistula. Openings in connection with the same fistula which appear subsequently are secondary openings and represent the surface terminations of offshoots from the main track. It must not be forgotten, however, that external openings may not always be connected with the same fistula. It sometimes happens that two or more separate fistulæ exist in the same patient, each having a separate internal opening. Instances occasionally occur in which two, three or four separate complete fistulæ co-exist in the same patient.

(2). The Internal Opening. Just as external openings are always found upon the skin surface, so internal openings are always located in the interior of the bowel and are perforations of the mucous coat. As a rule they are of small size and are generally circular in outline, but occasionally they are much larger and of irregular shape, as for example when they are the result of lacerations of the mucosa such as may be produced by the partial tearing through of the pedicle of a polypus, the tearing down of a valve of Morgagni, or an abrasion caused during the passage of a foreign body, such as a fish bone. When an internal opening is exceptionally large, the fistula is usually tuberculous in origin. The position of an internal opening varies according to the type of the fistula with which it is associated. Thus the internal opening of a para-rectal fistula is generally situated above the level of the levatores and from two to three inches above the anal margin. That in connection with a fistula of the submucous type may be situated anywhere along the course of the main track but is generally found immediately above Hilton's white line. The internal opening of a sub-sphincteric fistula is always situated in the anal canal in one of three situations at the level of the valves of Morgagni, namely, either in the right anterior quadrant or in the left anterior quadrant or in the middle line posteriorly. The internal opening of an ischio-rectal fistula is always situated in the middle line posteriorly at the level of the interval between the external and internal sphincters. The internal opening of the inter-muscular type may be situated anywhere in the circumference of the anal canal but always at the level of the interval between the sphincters.

In the majority of cases there is only one internal opening to each complete or blind internal fistula, but occasionally there are two. When a second internal opening of a fistula exists, it is generally situated at a higher level along the course of a submucous track extending vertically or obliquely upwards from the lower opening. When more than one internal opening is discovered at the same level each opening belongs to a separate fistula. If there is an internal opening at the level of the interval between the internal and external sphincters and a second opening is found high up with no intervening submucous track, both of them are internal openings of a para-rectal fistula.

(3). **The Main Track.** The main track of an ano-rectal fistula is the contracted but unobliterated cavity of the abscess which preceded it. It extends from the internal opening to the primary external opening and may take a straight, curved or tortuous course. Its anatomical position in regard to the coats of the terminal portion of the rectum and of the tissues in its immediate vicinity determines the type of the fistula. The exact position of the main track of a fistula in regard to the muscular apparatus controlling the outlet of the rectum is of the utmost importance from the point of view of surgical treatment. Failure to recognize that all fistulæ are not of the same type is responsible for the disastrous consequences that sometimes result from operative treatment.

(4). **Off-Shoots or Extensions from the Main Track.** From any part of the main track extensions may develop as the result of active suppuration taking place in its immediate vicinity. Secondary abscesses thus formed discharge their contents into the main track as well as through the skin by means of secondary external openings. Whenever there is a free discharge of pus either from the internal opening or from the primary external opening, the formation of an off-shoot from the main track is indicated. Repeated attacks of suppuration lead to the formation of multiple off-shoots from the main track so that, in the course of time, a labyrinth of inter-communicating channels is formed. Some types of fistula are more prone to ramification than others. All fistulæ are at first unilateral, but secondary off-shoots may extend across the middle line to the opposite side so that the fistula ultimately becomes bilaterally disposed. The off-shoots from the main track are not necessarily confined to the same anatomical locality, thus the secondary tracks in connection with an ischio-rectal fistula may be entirely located in the subcutaneous tissue, a complex fistula resulting to which the designation *fistula of the ischio-rectal type with subcutaneous extensions* should be applied. Again, an off-shoot from an ischio-rectal fistula may be located in the submucous tissue, when an *ischio-rectal fistula with submucous extension* results. It is important, therefore, when operating upon different types of fistulæ, to bear in mind the possibility of off-shoots existing in lymphatic areas other than those in which the main track is situated.

An off-shoot from a unilaterally situated fistula when extending across the middle line to the opposite side, by reason of the fact that the lymphatics on both sides are symmetrically disposed, follows an exactly identical course as that taken by the main track of the original fistula and is therefore a replica of it. The extension therefore simulates the main track of the original fistula, terminates in an external opening in a corresponding position to that occupied by the primary opening and gives rise to off-shoots following a similar course to those taken by the off-shoots from the original main track. The type of fistula which most commonly extends to the opposite side is the ischio-rectal, though the submucous type may occasionally do so.

General Principles of Treatment.

Whenever a fistulous communication with the interior of the anal canal or rectum has been established spontaneous cure seldom occurs. The tendency is for the fistula to extend in consequence of reinfection of the track through the internal opening. Even when an internal opening does not exist, and consequently infection from within cannot take place, the main track of the fistula rarely becomes obliterated on account of the constant movement of the sphincter muscles. The treatment, therefore, of an ano-rectal fistula is mainly operative, though in certain circumstances palliative measures may be adopted.

Palliative Treatment. This though it may sometimes succeed in arresting progressive extension, rarely effects a permanent cure. It should, however, be always adopted in cases in which a patient's constitutional condition contraindicates operative interference, unless active inflammation is causing severe pain and copious purulent discharge indicates the formation of secondary abscesses in the neighbourhood of the main track. Improvement in a patient's general condition may be obtained by a change of environment, rest, plain wholesome food and avoidance of alcohol. Local treatment, such as the use of warm Sitz baths and the application of fomentations to the perineum, is advisable. Daily evacuation of the bowels should be ensured by the use of mild aperients, but strong purgatives should be avoided as violent peristalsis may force liquid fæces into the internal opening and set up active suppuration in the main track.

Operative Treatment. The surgical treatment of a fistulous track is comparable to the conversion of a subterranean tunnel into an open trench by digging away the earth covering it from end to end and then filling in the trench with new material until it is level with the surrounding surface. By adopting this principle the tissues overlying the main track of a fistula, from the primary external opening to the internal opening, are divided so that an open wound is created which is made to heal progressively from the bottom, and so efface the fistula. Offshoots extending into the surrounding tissues are dealt with in a similar manner. The principle underlying the surgical treatment of a fistula is to lay open the main track from end to end together with all the offshoots extending from it. It is possible to efface all fistulæ in this way, but whether a satisfactory result is obtained or not depends upon the damage that may be inflicted upon the muscular apparatus controlling the anal outlet. Although the majority of ano-rectal fistulæ communicate with the interior of the bowel by means of an internal opening, in only a small percentage is its muscular coat penetrated by the main track of the fistula, but in these the laying open of the main track from end to end results in serious impairment of the muscular control of the anus. If all ano-rectal fistulæ were of the same type the simple procedure of laying open the main track from end to end together with all offshoots from it would produce equally good results. Unfortunately, however, in some instances permanent loss of muscular control ensues. The explanation of this is that the anatomical relationship of the main track to the musculature of the anal outlet varies in different types of fistulæ. The position of the internal opening can usually be taken as an indication of the point where the main track passes through the bowel wall. The usual position of an internal opening is at the level of the interval between the internal and the external sphincters, which is approximately at Hilton's white line, but in some instances it may be found at a much higher level, for example quite two or three inches above the anal margin. A high-lying internal opening does not, however, always indicate that the main track of the fistula penetrates the wall of the bowel at a corresponding level.

A great deal of controversy has centred round this point. Some authorities state that in their experience no harm results from laying open the main track of a fistula which has a high-lying internal opening whereas others of considerable experience aver with equal conviction that in similar circumstances permanent loss of control inevitably results. When two such divergent opinions are expressed by those who have had considerable experience in the operative treatment of ano-rectal fistulæ, it is obvious that there must be some explanation to account for the discrepancy. The truth of the matter is that neither group of observers has realized the fact that ano-rectal fistulæ differ widely in type, so that whereas both are right in the opinion expressed both are also wrong.

Let us take, for example, the case of a submucous fistula having a high-lying internal opening such as is represented in Fig. 1. The main track of such a fistula is throughout its course superficial to the muscular coats of the bowel and to both sphincters. Laying open the main track of such a fistula into the cavity of the bowel cannot possibly inflict any injury to the musculature and therefore no impairment of control can possibly result. Again, in the case of an ischio-rectal fistula with a submucous extension having an internal opening at the upper extremity of the submucous portion of the track as shown in Fig. 2, laying open the track from the external opening to the internal opening

FIG. 1.—Complete submucous fistula.

A, Mucosa. B, Muscular coat. C, Pelvic peritoneum. D, High-lying internal opening of the fistula. E, Main track of fistula. F, Levator ani. G, Internal sphincter. H, External sphincter. I, External opening of fistula.

FIG. 2.—Ischio-rectal fistula with submucous extension.

A, Internal opening ; and B, external opening of fistula.

into the cavity of the rectum only inflicts injury to the external sphincter from which it is common knowledge that impairment of control does not result. It is obvious, therefore, that those who hold the opinion that the laying open of a fistulous track having a high-lying internal opening, may be carried out without inflicting impairment of control must have been fortunate enough to encounter only fistulæ of the above types. On the other hand, those who have experienced the disastrous consequence of permanent loss of control have probably been unfortunate enough to encounter fistulæ of the type shown in Fig. 3 during the early stages of their experience.

It is apparent from a glance at the illustration that laying open the main track of this type of fistula (the para-rectal) into the cavity of the bowel would result in complete division of both sphincters, both muscular coats of the rectum as far as the site of the internal opening and, what is more important still, the

FIG. 3. Complete para-rectal fistula.

A, Internal opening. B, Main track. C, External opening of the fistula.

point of fusion of the levator ani muscle with the external muscular coat of the rectum. The fibres of the levatores ani muscles radiate from the periphery of the pelvis to the rectum in the same manner as do those of the ciliary muscle towards the pupil. Contraction of the ciliary muscle dilates the pupil and contraction of the levatores ani expands the anal canal. When the margin of the pupil is divided, a V-shaped gap is produced by the unopposed contraction of the radiating fibres of the ciliary muscle. Exactly the same thing takes place when the point of fusion between the levator and the external muscular coat of the rectum is divided. A V-shaped gap is produced owing to retraction of the edges of the wound and hopeless incontinence is the result. Division of the internal sphincter is generally regarded as the cause of loss of control after fistula operations, but I have not found it to occur even after complete division of the muscle when laying open the main track of an intermuscular fistula. Other observers regard division of the external sphincter as the causative factor of impairment of control after operations for fistula, but these have evidently overlooked the fact that the external sphincter is generally completely divided during the operation for fissure without ill effect.

The position of the internal opening of a fistula is of very little consequence in determining the nature of the operation to be performed, but the anatomical situation of the main track in its relation to the musculature of the anal outlet is of the greatest importance. If all fistulæ were of the same type, operative treatment would be a simple matter, because the same type of operation would suffice for all.

An important principle involved in the surgical treatment of fistulæ is that the square area of the surface wound should be made at least twice as great as the square area of the rest of the wound. The most satisfactory way of increasing the surface area of a linear wound is to make incisions through the skin and subcutaneous tissue at right angles to the line of the main incision. I call these secondary incisions *relieving cuts*. They should be made at points where there appears to be greatest tension along the margins of the main incision. No definite rules can be laid down in regard to their exact position or as to the number of incisions required, much depending upon individual experience as to the manner in which the wounds heal, but, provided that the surface area is increased to the requisite extent, the fewer the incisions required the better the ultimate result will be.

When operating upon fistulæ lying at a great depth, such as those of the para-rectal type, the surface area of the whole wound may be so large that it is not possible to extend the surface wound sufficiently on account of there being lack of room. Under these circumstances the surface wound will have healed long before the remainder of the wound has been completely filled in. Nevertheless, the depth of the original wound will have been diminished considerably, in most instances by more than half its original extent. In order to permit of the remainder of the wound being completely filled in, the surface wound should be reopened up to the required extent. When dealing with this type of fistula, the possibility of a second operation becoming necessary, in order to effect complete effacement of the fistulous track, should never be lost sight of.