

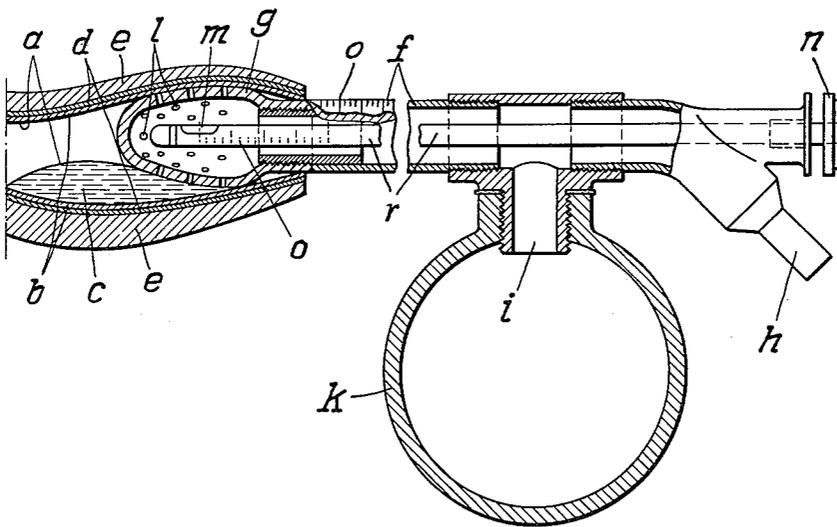
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RECTOSCOPIC DEVICES

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RECTOSCOPIC DEVICES

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This invention concerns improvements in or relating to rectoscopic devices. All previous devices for the withdrawal by suction of fluids or secretions from the stomach, intestines, bladder or other cavities of the body are subject to the requirement that the device dips, wholly or partially, into the medium to be drawn off and that the latter, as regards its position and extent, has first been determined exactly by some other device. None of the hitherto known devices, however, makes it possible to draw off the invisible fluid pockets in the bowel wall of the rectum, the position and extent of which are merely assumed and which are separated from the suction member by a layer of skin, and at the same time, after the bowel wall has first been examined for discolouration and other deformities by means of the same apparatus, to make the suction action visible by means of a built-in optical system. A device of this nature has not hitherto been required in medical science, since no corresponding diagnosis existed. The knowledge of the causes of psoriasis now makes such a device necessary.

Even now psoriasis is considered to be an incurable disease of unknown causes in which one can only achieve a temporary improvement by various medical preparations mostly applied externally. Psoriasis is considered by most specialists to be an allergic metabolic disease based on hereditary inclinations.

However, observations and experiments over many years resulted in the following new knowledge:

(1) The scales which psoriasis produces on the surface of the skin, and the fluid which the rectum excretes for self purification, are identical.

(2) Psoriasis arises only when, owing to a local pathological change in the mucosa, the rectum is incapable of excreting the fluid in a natural way.

The larger the centres of disease of psoriasis are, the greater will be the amount of fluid blocked in the bowel wall of the rectum.

In order to appreciate the technical problems which arise from this knowledge, it is necessary to establish the nature of the changes in the anatomical structure of the rectum, which are caused by the disease. For this purpose there is shown in the accompanying drawing the diseased portion of the bowel of the rectum, together with a device according to the invention in section. As a result of constipation of the bowel or chronic sluggishness of the bowel, at first an inflammation of the mucosa arises in the rectum, as a rule at a distance of 15-20 cm. from the anus. At a corresponding location this results in a local separation of the uppermost layer of the mucosa *a* (tunica mucosa) from the bowel wall. The mucosa *b* itself (lamina muscularis mucosa) lying beneath now secretes the fluid *c* into the resultant hollow space. During the initial stage, the fluid is passed to the interior of the bowel through the pores of the tunica. Gradually, however, the pores of the tunica become blocked up since they are no longer capable of following the oscillatory movement of the bowel owing to their separation from the bowel wall, since, furthermore, the oscillatory movements of the rectum become increasingly more sluggish owing to the swelling of the bowel, saturated with liquid, and since the bowel is cramped in the diseased area, in the attempt to express the fluid as a foreign body. As has already been indicated, the next consequence is that the fluid, like any other fluid, is sucked up by the rectum, enters the blood stream, and is finally

secreted on the surface of the skin as scales of psoriasis. As a result of the fluid continuously sucked up, the lowest layer of mucosa *d* (submucosa) and the bowel wall proper *e*, which consists of the circular and longitudinal muscle layers, are strongly swollen, so that the bowel gives the outward appearance of a colonic inflammation. The contrast picture of a bowel diseased in this way only shows a constriction in the diseased area, the fluid secretions, however, remain invisible. The rectoscopic examination never yields any discovery. The reasons for this are as follows: in the first instance, with a small separation area of the tunica mucosa, the fluid accumulating is promptly sucked up by the bowel, so that the separation of it remains invisible, and secondly the known means do not make it possible to recognise the blocking up of the pores of the tunica. Only when the separation area of the tunica is extremely large and the suction capacity of the bowel does not suffice immediately to absorb the fluid accumulating, can the fluid secretions be recognised by congestion beneath the tunica, and by a slight discolouration of the uppermost layer of mucosa.

After having recognised these changes of the anatomical structure of the rectum, caused by the disease, the technical problem to be solved becomes apparent.

According to the invention therefore there is provided a device for the examination of, and the application of suction to, the bowel comprising in combination a tube or pipe for connection at one end to a source of suction pressure and having a container for fluid which in operation is drawn off by the device, the other end of said tube being of substantially egg shape and at least partially of transparent material, said other end having apertures therethrough for the trans-mission, during use, of suction pressure, and a rectoscope the optical system of which is disposed in said egg shaped end. By means of this transparent egg shaped member and the built-in optical system, the examination of the rectum, and particularly of the mucosa is made possible, by means of the boreholes provided in the egg shaped member and the suction pressure produced there the blocked pores of the uppermost layer of mucosa are cleared and the fluid secretions beneath sucked off. At the same time these steps are rendered visible by the built-in optical system, and thus the position and extent of the invisible fluid secretions can be recognised. The incorporation of the optical system makes it furthermore possible that the suction action at a diseased area shall not last longer than is really necessary, and that the suction action in the healthy area of the bowel shall be limited to a short time. Since the bowel is constricted in the diseased area and the pores of the tunica are blocked up, the apparatus, before the actual treatment must stretch the bowel in order to loosen the fluid and excreta agglomerations which are blocking the pores, and to make the fluid secretions lying beneath the tunica accessible to the influence of the suction.

The accompanying drawing shows in cross section a combined suction and examining apparatus for the rectum at the entry into the diseased end of the bowel. It consists in the main of a transparent egg shaped portion *g* to be introduced into the rectum by means of a composite suction tube or pipe *f*. The tube *f* is reduced at the other end to a mouthpiece *h* which receives a tube (not shown) leading to the suction pump. On its underside the suction tube is provided with an aperture *i* through which the fluid sucked off can emerge into a container *k*, connected therewith in an airtight manner, this container being preferably of transparent material. The egg portion *g* at the outermost end of the suction pipe has on its circumference bore holes *l* or other apertures which transmit the suction pressure produced inside the egg portion to the pores of the tunica mucosa,

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stretched by the said egg portion, and to the bowel wall therebeneath. The start and the finish of the suction action, as well as the surface of the mucosa are observed through the optical system, incorporated in the suction tube or the egg portion by means of a lamp and mirror *m* in the rectoscope *r*, and the eye-piece *n* at the end of the suction tube. A graduated linear scale *o* is provided on the suction tube in order to facilitate reading the distance between the fluid secretion and the anus.

The length scale *o* also enables the reading of the length to which the instrument has been introduced into the intestine so that a repeated treatment of one and the same part of the intestine is possible without need for using the optical system of the rectoscope because the scale *o* enables the movement of the egg-shaped hollow body *g* to be moved always to the same point of the intestine by reference to one and the same division of the scale *o*.

What is claimed is:

1. A surgical apparatus for examination of diseased mucosa in an intestine and for withdrawal by suction of secretion from the mucosa, particularly in the area of the sigmoid flexure of the intestine, said apparatus comprising, in combination, an elongated suction tube of substantially constant diameter, said suction tube having a first and a second longitudinal end and formed with a smooth outer surface; a substantially egg-shaped hollow body airtightly joined with one longitudinal end of said suction tube, said hollow body having a smooth outer surface with a gradual transition into the outer surface of said suction tube and formed with aperture means communicating with the interior of said suction tube; a rectoscope disposed in said suction tube, said rectoscope comprising an optical system for observation of the mucosa normally located in said hollow body and eyepiece means optically coaxial with and spaced from said optical system and located at the other longitudinal end of said suction tube; container means communicatively connected with said suction tube in the proximity of said other end thereof; and means provided in the proximity of said other end for connecting said suction tube to a source of vacuum whereby, when said hollow body is inserted into the intestine, secretion is withdrawn from the mucosa through said aperture means and through said suction tube and is collected in said container means.

2. A surgical apparatus for examination of diseased mucosa in an intestine and for withdrawal by suction of secretion from the mucosa, particularly in the area of the sigmoid flexure of the intestine, said apparatus comprising, in combination, an elongated suction tube of substantially constant diameter, said suction tube having a first and a second longitudinal end and formed with a smooth outer surface; a substantially egg-shaped hollow

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body of transparent material airtightly joined with one longitudinal end of said suction tube, said hollow body having a smooth outer surface with a gradual transition into the outer surface of said suction tube and formed with aperture means communicating with the interior of said suction tube; a rectoscope disposed in said suction tube, said rectoscope comprising an optical system for observation of the mucosa normally located in said hollow body and eyepiece means optically coaxial with and spaced from said optical system and located at the other longitudinal end of said suction tube; container means communicatively connected with said suction tube in the proximity of said other end thereof; and means provided in the proximity of said other end for connecting said suction tube to a source of vacuum whereby, when said hollow body is inserted into the intestine, secretion is withdrawn from the mucosa through said aperture means and through said suction tube and is collected in said container means.

3. A surgical apparatus for examination of diseased mucosa in an intestine and for withdrawal by suction of secretion from the mucosa, particularly in the area of the sigmoid flexure of the intestine, said apparatus comprising, in combination, an elongated suction tube of substantially constant diameter, said suction tube having a first and a second longitudinal end and formed with a smooth outer surface; a substantially egg-shaped hollow body airtightly joined with one longitudinal end of said suction tube, said hollow body having a smooth outer surface with a gradual transition into the outer surface of said suction tube and formed with aperture means communicating with the interior of said suction tube, at least a portion of said suction tube adjacent to said hollow body consisting of transparent material; a rectoscope disposed in said suction tube, said rectoscope comprising an optical system for observation of the mucosa normally located in said hollow body and eyepiece means optically coaxial with and spaced from said optical system and located at the other longitudinal end of said suction tube; container means communicatively connected with said suction tube in the proximity of said other end thereof; and means provided in the proximity of said other end for connecting said suction tube to a source of vacuum whereby, when said hollow body is inserted into the intestine, secretion is withdrawn from the mucosa through said aperture means and through said suction tube and is collected in said container means.

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