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twenty per cent. solution, according to the sensitiveness of the patient, may be performed, though many bear the little operation without any previous local anæsthesia. As a rule, a layer of thickened and callous epidermis will be found around the free border of the nail, into which the slight incisions can be made without inducing any pain worth speaking of. I have found that, no matter how carelessly this little operation might be performed, the inconvenience caused is so slight, compared to the benefits derived therefrom, that it ought never to be dispensed with in a given case. The next step is to abundantly apply the salve to the affected parts. I usually direct my patients to immerse the finger into the salve-pot, so that by directly impregnating the scarifications rapid absorption may result. A strip of lint is then closely wrapped around the affected finger, upon which, in turn, the salve is thickly applied, until it is thoroughly saturated with it. This forms a constant source of supply for the points of scarification, which supply is retained by application of the gutta-percha tissue. A layer of cotton and a moist gauze bandage complete the dressing. Rubbing in of the ointment is painful and unnecessary, since the dressing forces it mechanically into the scarifications.

It is sufficient to renew the impregnation twice daily, though as to this the subjective sensations of the patient are the best guide. The scarifications being sufficiently numerous to absorb the resorcin, an amelioration of the pain and tension is noticeable in from six to twelve hours.

One of the first requisites to the success of the treatment is its timely application. In the stage of erythematous redness, when the dorsal surface of the ungual phalanx or the nail-fold is reddened and glistening, when the patient first experiences pain, the inoculation of resorcin will almost positively abort the inflammation and prevent suppuration. The same favorable result is obtained in volar phalangitis also, provided the case presents itself before the exudation has exerted such a pressure on the dense vertical fasciculi of connective tissue as to cause necrobiosis and suppuration. When severe pain sets in in a circumscribed area of the finger-tip—which may appear turgescent, tense, reddened, and pulsating from the engorgement of its vessels, lymphangitis and lymphadenitis already commencing to show themselves, perhaps the finger being instinctively held in an elevated position—the process is still within the bounds of successful treatment by means of resorcin inoculation.

That the quick subsidence of the threatening symptoms in such a case is distinctly due to the inoculation and subsequent rapid absorption of resorcin, I believe to be beyond doubt. The application of the drug to the intact integument would not act promptly enough to prevent the rapid absorption of the infectious material. The introduction of the resorcin into the rete mucosum, or into the superficial layers of the cutis, as I advise it, must necessarily hasten its absorption and have a destructive effect on the infectious matter, since the drug is forced into the open mouths of the lymph- and blood-capillaries. Nevertheless, the epidermic use of resorcin along the track of the inflamed lymph-canals is of an importance not to be underrated, and should be made use of in every case in which lymphangitis exists.

To resume, resorcin used in the manner described will be accepted as an effective remedy in all furuncular and phlegmonous inflammations; it aborts the inflammation, if used in time, by destroying the germ locally as well as in the lymph-canals leading from the point of infection, at the same time acting as an anæsthetic on the terminal filaments of the sensitive nerves. This is accomplished in the surest way by the method of scarification and continuous impregnation.

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Dr. Richard Maly has been nominated for the position of professor of chemistry in the German University of Prague.

THE PRINCIPLES OF WOUND DRAINAGE AND THE USE OF HARD RUBBER DRAINS.

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The importance of dryness as a condition of wound hygiene has had, during the last few years, an increasing recognition, as manifested by the number of recent dry dressings and implements for drainage. Of the former, perhaps, it may be true that perfection has been approached; but certainly not of the latter, since none of them has altogether supplanted the soft rubber tube, with all its imperfections.

The mechanical principles operating to drain a fresh wound may be considered, in their natural sequence, under the following heads:

I. The action of the tissues.

II. Gravity.

III. The action of the drain.

I. There are occasionally to be removed from a wound, by drainage, before its healing can be accomplished, such solids as particles of bone, and very commonly such semisolids as blood-clots, flocculi of lymph, and detached shreds of tissue. The function of the first or serous discharge from a wounded surface is, as regards these loose fragments, simply that of a vehicle for their removal. Should it not suffice, and, on the other hand, should they fail to secure vital union with the neighboring tissues, their disintegration is accomplished after a time by the formation of pus, and their expulsion is thus rendered more certain. All foreign bodies in a wound, whether derived from the tissues themselves or introduced from without, tend in a varying degree to increase fluxion into it. Certain kinds, whose surfaces are rough and mobile, have also the property of causing coagulation of the fibrin contained in the wound exudations. The clots thus formed, those already existing, and bits of soft tissue when present, retain in themselves fluid which frequently prevents their permanent adhesion to adjacent parts and makes them very liable to become necrosed before they can escape. The importance of promptly removing these substances, or, at least, of depriving them of their liquid, as a preventive of suppuration, is evident.

II. The current bearing the cast-off material is subject to (i.) its own *vis a tergo*, as fluid continues to be discharged from the tissues, to (ii.) the force of gravity, and possibly to (iii.) the capillary attraction caused by approximated surfaces. But the last-named force alone doubtless never retains enough fluid to prevent healing. The necessity of being guided by the law of gravity in determining the location and position of a drain needs no emphasis.

III. Regarded as a foreign body, it is evident that the merits of a drain are inversely as its activity in causing fluxion, coagulation and obstruction of the discharges, and mechanical injury to the tissues by pressure or friction. Drains may be divided, according to the principles upon which they act, into two distinct classes—capillary and tubular. The former obstruct the egress of everything except fluid, and, because of their fibrous surfaces, are probably active in bringing about coagulation and fluxion. They have, however, the compensative merit of an absorbent power, in draining off the liquid which renders prejudicial the presence of soft, moist substances. Such a drain, forming the extension of an absorbent dry dressing, may have large hygroscopic capacity. The dressing should, of course, be not merely a receptacle for discharges, but should have the power of absorbing from the drain, as the latter has of absorbing from the wound; otherwise the drain itself becomes saturated and a source of danger. Capillary drains are less completely dependent upon the force of gravity than are those of tubular shape. An open or tubular drain is simply a tissue retractor to maintain a channel, and has no inherent power to take up to,

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retain, or to transmit. Its contents may be impelled by accessions of fluid discharged from the tissues, but the sole principle which is relied upon for its operation is the force of gravity. Aside from its passivity as a foreign body, the value of a capillary drain depends upon its activity in absorbing fluid, that of a tubular drain upon the opportunity it furnishes solids, semisolids, and liquids to pass into and through it. There is a class of drains, including both the open form, as those of decalcified bone, and the capillary, as those of catgut, which from the nature of their material have comparatively little potency in causing fluxion, coagulation, obstruction, or mechanical injury. By the imbibition of liquid a gradually increasing soft, gelatinous layer is formed upon their surface, thus protecting the tissues with which they come in contact, and preventing the formation and deposit of fibrinous clots. The soluble portion of these drains finally becomes transformed into a homogeneous liquid which may either escape or be absorbed. A small amount of basement structure, sufficiently organized to readily take up vital connection with adjacent parts, remains. A soft drain of this kind is less prejudicial to a wound than a clot or similar substance, because the latter cannot be liquefied except by a necrotic process, and, on the other hand, is not so highly organized, and therefore so ready to unite with the parts as is the structural base of an animal drain. The practical objection to these temporary affairs is their uncertainty. They may fail to maintain their existence long enough, or may be too slow in softening.

While it is unnecessary to discuss the advantages and disadvantages of each of the multitude of drains known to surgery, it is worthy of remark that the one probably in most general use—the soft rubber tube—has to a peculiar degree all unfavorable mechanical properties possible, except that of rigidity, which, by the by, is not always a disadvantage. Its surface is rough and its lateral openings are small, and usually angular. Their edges invite the coagulation of fibrin, and increasing deposits frequently obstruct the apertures and may even occlude the lumen of the tube. The presence of such a body, with its load of disintegrating material, is one of the most frequent causes of failure to secure primary union. It is an open question whether, under these circumstances, the admission of germs from without is a necessary factor in the production of suppuration.

With a view to meeting the indications touched upon, I would call the attention of the profession to the possibilities of hard rubber as a material for wound drains, and present as examples the forms shown in the accompanying cuts.

FIG. 1.

That represented in Fig. 1 is flexible. It consists of a thin tube, the convex surface of which is perforated by a single long aperture, rounded at each extremity, and winding spirally about the tube but terminating a short distance from each end of it. The area of this opening, which is narrower than would appear from the cut, is about one-fourth that of the convex surface of the tube, exclusive of those portions where the cylinder is entire. Close to each end of the drain, and near together, are two small holes. The instruments are smooth and polished without, within, and on the edges. They are made eight inches long, and of four diameters, one-fourth, five-sixteenths, three-eighths, and seven-sixteenths of an inch externally, and are known as Nos. 1, 2, 3, and 4 respectively. Each is intended to be divided into two drains, and is easily cut with knife or scissors, but it is better to soften the place where section is to be made. The flame of a match will suffice. The sharp edge made by cutting should be rounded with a fine emery cloth, and can be polished by means of crocus and oil. The makers, Messrs. Tiemann & Co., will furnish this instrument cut to any length and finished, and also that one shown in Fig. 2. By the use of hot water or dry heat one of these drains may be given a permanent curve corresponding to that of the wound, and by twisting it while soft the width of the spiral opening may be modified. The end of the drain where the circumference is unbroken is placed externally in the wound. The spiral opening is not continued to the end of the drain, because the skin is thus liable to drop into it, and obstruct the tube. The two small holes are for the insertion of a hare-lip pin, safety pin, a stitch, or other means of securing the instrument in place. In all tubular drains the best openings are at the ends. A drain should therefore be as short as it can safely be used and in a wound with two openings should not pass through it from one to the other, but two drains should be introduced. This is especially important when one opening is superior and is for the purpose of admitting irrigating fluid intended to reach all parts of the wound, and not merely to pass through the drains. The tube may be filled with catgut, horse-hair, or similar capillary material and the strands extended in all directions. They may be subsequently withdrawn, leaving the tube *in situ*, or may be left and the tube removed.

For this instrument the following merits are claimed: 1. As a foreign body it is comparatively harmless. The fact is well known that hard rubber pessaries cause much less vaginal secretion than those of soft rubber. Smooth, hard bodies, buried in the tissues, frequently become encysted, but soft substances usually give rise to abscess. It presents everywhere a polished surface; its aperture is the largest possible, with the smallest possible extent of edge; this edge is smooth, thin, and uninterrupted by angle, crevice, or sharp turn, with the exceptions of that at the end of the spiral opening and of the two small holes which are external to the wound. For these reasons it is not liable to cause coagulation, and the opportunity for coagula to adhere to and obstruct it is reduced to a minimum. Furthermore, by reason of its flexibility it cannot injure the tissues mechanically, except it be crowded into a situation where, by its mere presence, it interferes with the circulation. Its edges cannot sink into the soft parts, because of the width of the strip between them. 2. As it is unaffected by secretions or by chemical germicides it may be used again and again *ad infinitum*. 3. It cannot collapse. This property may prove valuable when considerable pressure by bandage is necessary to arrest oozing and prevent the formation of pockets. 4. From the thinness of its walls it is light, and has large capacity in proportion to its size. 5. Should granulations grow into it, its removal without injuring them is easily accomplished by a screw motion.

FIG. 2.

The instrument shown in Fig. 2 and which, for distinction, may be called an inflexible drain, consists simply of a thin, hard rubber tube, upon one end of which is a rounded flange, while from the other, two opposite slits extend nearly the whole length of the instrument. Should occasion require, the blades on either side of the slit may be fixed, by the use of hot water, at any degree of divergence. This drain, like the preceding, is everywhere rounded and polished, and its only crevices are at the ends of the longitudinal slits. It is placed in a wound so that its flange is external, and is also provided with two small holes for the purpose of fixing it. The blades are quite yielding in the direction indicated by the dotted lines. It is made in the following sizes: No. 1, diameter, one-fourth inch; length, one and one-half inch; No. 2, diameter, five-sixteenths of an inch; length, two inches; No. 3, diameter, three-eighths of an inch; length, two and one-half inches; No. 4, di-

ameter, seven-sixteenths of an inch; length, three inches.

Probably other forms will be devised in which this material will be found a useful one for wound drains. In hip-joint abscess it has been well borne, and is easy of removal and replacement in the form of a round or flattened tube without lateral openings. Though holes of any size and shape may be made in hard rubber tubing, it should always be borne in mind that any drain should be as free as possible from irregularities of surface.

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FOREIGN BODIES IN THE INTESTINES.

Dr. Boardman Reed, of Atlantic City, N. J., writes: "Apropos of several cases of coin-swallowing recently reported in The Medical Record, I have to relate a case in which an irregular disjointed half of a sleeve-stud was swallowed by a four-year-old boy, and passed without injury. One month ago I was called to see a rather puny, delicate boy of four years, who had just swallowed part of a gold sleeve-stud. The corresponding part of the other stud was shown me. It consisted of a button-shaped disk nearly half an inch in diameter, with a small cylindrical stem projecting from it about one quarter of an inch. From this stem, again, there projected three little metallic points which could be pressed in, but were pushed out again by springs when the pressure was removed. It was altogether an ugly-looking instrument to expect to find its way through the human alimentary canal, and I had many misgivings about it. I ordered two teaspoonfuls of castor-oil, followed by plenty of mush and other coarse diet. The button passed safely in about thirty-six hours, without any pain having been complained of."

PERITONITIS FOLLOWING HERNIOTOMY TREATED BY IRRIGATION AND DRAINAGE OF THE ABDOMINAL CAVITY.

Dr. J. E. Summers, Jr., of Omaha, Neb., reports the following case:

Mrs. T——, a robust German, married, aged twenty-seven, entered the Child's Hospital, August 2d, for relief from a rather large femoral hernia on the right side, which she had had for three and one-half years, and which for five days had been irreducible. There were no symptoms of strangulation; only discomfort was complained of. As the woman was anxious to be cured of her infirmity, I operated on the third day after her admission, with the intention of relieving the constriction, and then doing an operation for the radical cure. The sac, on account of its thickened and inflamed condition, was with difficulty recognizable as such. It was opened, and a large piece of omentum, also inflamed, was cut off in the usual way, carbolized silk being used for ligation. No attempt at closing the canal being deemed advisable, the ring was dilated by a blunt instrument passed in along the inner border of the canal, internal to the sac, and upward traction made. (A conical urethral sound is sometimes advantageously used, as this was, in strangulated herniæ, instead of the knife.)

The sac was then cut short, and its circumference (the inner two-thirds) united with catgut to the edge of the femoral ring; the external segment was fixed by passing the needle through the tissues and skin covering it. A drainage-tube was introduced through the ring, the wound irrigated with a warm solution of bichloride of mercury, 1–1,000, and antiseptic dressings applied. Twenty-four hours after the operation a general peritonitis developed. The abdominal cavity was well irrigated twice daily with a warm solution of 1–5,000 bichloride of mercury for three days, when, a diarrhœa setting in, the bichloride solution was replaced by a one per cent. solution of carbolic acid, and the diarrhœa subsided. At times, when irrigating, the drainage-tube, more than ten inches in length, was replaced by a 22 F. nearly straight metal tube, passed well up into the abdominal cavity. Some fluid always remained behind, but it came away in the dressings, drainage being favored by position. At each irrigation pus and fibrin, in quantities sufficient to make a heavy cloud in the vessel, were removed. After irrigation there was always a noticeable fall of temperature and a better general condition of the patient. Dry cold by means of a Leiter's coil, morphine subcutaneously in quantities sufficient to control *all* pain, and a milk diet, constituted the rest of the treatment. The patient's convalescence was interrupted by a sharp attack of cellulitis on the left side, but this was soon brought under control by the use of long-continued hot-water irrigation of the vagina, and morphine subcutaneously. On the fourteenth day the temperature had reached the normal point; it had varied from 102° to 104° F. Shorter and smaller drainage tubes were gradually substituted, a change being made daily for four or five days, when they were withdrawn altogether; the wound contracted slowly, but is now completely healed. Whether the peritonitis was the result of a faulty antisepsis, or directly dependent upon the operative procedure, matters little. The interest in the case centres in the treatment, which in principle is the same as in those cases of suppurative peritonitis which have been treated by abdominal section and drainage.

THE CONSTITUTIONAL EFFECTS OF RHUS TOXICODENDRON.

Dr. Robert Hubbard, of Bridgeport, Conn., referring to the report of a case by Dr. White in a recent issue of The Medical Record, affirms his belief that the poison of rhus may produce constitutional effects. In support of this view he reports the following case: "Many years ago a healthy man, about thirty years of age, consulted me for a vesicular eruption, covering the whole body, without febrile disturbance, but attended with severe burning and itching; otherwise he was in perfect health. He said he consulted me because his regular attendant said he was suffering from scarlatina. The appearance of the eruption suggested ivy-poisoning, and I inquired if he had not been exposed to it; to which he replied confidently that he had not. On cross-questioning him closely I learned that his special work was lettering monuments and that he had, a few days before, been at work in Mountain Grove Cemetery, where the rhus toxicodendron is abundant. I suggested to him that possibly he had thus been incidentally poisoned. He, however, declared he had handled no shrubbery, except that he had pulled up a root of sarsaparilla, which also abounds there, and *ate it*. Doubtless he mistook a small specimen of the rhus, and hence, in my opinion, the result. The eruption differed from that produced by external application only in the size of the vesicles, which were smaller. I notice that many writers consider the eruption an eczema artificially produced, whereas I think the greater thickness of the envelopes of the vesicles and the greater delay in rupturing, distinguish it from vesicular eczema and place it more properly among the varieties of herpes.

Billroth would probably never have been the surgeon he is but for the influence of Langenbeck. The mantle has fallen with a double portion of his spirit. Langenbeck's pupil is not content to let power die with himself, as will be shown by the simple mention of a few of his former assistants and students—Menzel, of Trieste; Czerny, of Heidelberg; Winiwarter, of Luttech; Gussenbauer, of Prague; Mikulicz, of Krakan; Wolfler, now of Graz; and Hacker, of Vienna.—*Ex.*