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### THE DRESSING OF WOUNDS.

Read before the Massachusetts Medical Society, June 2, 1874.

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It is the business of the physician to know things similar and things dissimilar, says Hippocrates, in his Tract on the Surgery; and one may well believe him, in view of the contrariety of doctrines promulgated and enforced in these latter days. Only a few years ago, it was dogmatically declared that wounds should be *excluded from the air* in antiseptic dressings. Now comes an equally urgent advocacy of *leaving them untouched*—the open treatment, as it is called; while between these extremes we have every variety of practice, leaning toward one or the other method, according as the convictions of the practitioner incline him.

Since such diversities exist in the manner of dressing wounds, amounting, apparently, if not in reality, to modes diametrically opposed to each other, it becomes us to consider carefully the various methods which their advocates present; to weigh well the results claimed, as to whether they are fairly stated, or are intentionally or otherwise warped to favor the views advanced; and then to adopt such methods in the dressing of wounds as study and experience convince us to be best suited to our patients.

Few physicians are so situated that they can entirely ignore the treatment of wounds; for, although the majority of the profession may not claim to make surgery a specialty, and may decline to treat the severer injuries or diseases which are classed as surgical, yet almost all of us must attend to such as come under the classification of minor surgery, which, if mal-treated, may result most unfortunately for the patient and the physician.

Probably, from very early times, it was noticed that in injuries where the tissues were so lacerated that the wounds were exposed to the air, the condition was vastly more unfavorable for the restoration of the integrity of the part, and the rapidity of healing, than where the wounds were subcutaneous. Mr. Hunter\* divided the injuries done to sound parts into two sorts, according to the effects of the accident. He says: "The first kind consists of those in which the injured parts do not communicate externally, as concussions of the whole body, or of particular parts, strains, bruises and simple fractures, which form a large division. The second consists of those which have an external communication, comprehending wounds of all kinds,

\* Works, vol. iii. p. 240, quoted by Paget.

and compound fractures. The injuries of the first division, in which the parts do not communicate externally, seldom inflame; while those of the second commonly both inflame and suppurate." Mr. Paget\* states that it hardly seems possible to exaggerate the importance of the principle which Hunter has embodied in these sentences. "For of the two injuries inflicted in a wound, the mechanical disturbance of the parts, and the exposure to the air of those that were covered, the exposure, if continued, is the worse."

The recognition of the fact that wounds to which the air has free access usually inflame and suppurate, has probably given rise to the attempt to render open wounds practically subcutaneous, by means of such dressings as should exclude the air. It is one thing, however, to have the tissues unbroken, and the injured parts not exposed to the air, and quite another to treat as of this class wounds to which the air has once had free admission. Unless we have good reason to believe that art can, by its appliances, render practically subcutaneous a wound that has once been open, it is better to anticipate the probability of inflammation and suppuration, and to provide for them.

The most prominent advocate of modern times for the occlusive treatment of wounds is Prof. Lister, of Edinburgh. Accepting the teachings of Pasteur, that the particles of dust which the atmosphere contains are germs of bacteria or other allied organisms, and are the exciters of the putrefactive changes that occur in wounds, he endeavors by antiseptic dressings to deprive the atmospheric germs of their septic energy, so that whatever air reaches the wound shall contain no particles capable of exciting septic changes in it. The dressings are practically impervious to the air, and are to be applied with scrupulous attention to the minutiae which the author of the system imposes. He claims in this way to bring open wounds approximately to the condition of subcutaneous ones. His method is briefly as follows:

A piece of oiled silk protective is applied to the skin, over the protective is laid a quantity of antiseptic gauze, folded in several layers, usually eight, while between the two outer layers of gauze a piece of waterproof Mackintosh is placed. The whole is retained by a bandage of gauze, properly applied. While the part is being operated on or dressed, a spray of a solution of carbolic acid is kept constantly playing over it. Vessels are tied with antiseptic catgut ligature, and carbolized silk is used for sutures.

That the plan is a complicated one is evident. It may be carried out in hospitals, but certainly in private practice it can only be followed with extreme difficulty. If the results show it to be superior to any other method, no pains should be spared to adopt it.

Lister, as is well known, claims remarkably successful results for his method. One of his disciples† goes so far as to state that "the antiseptic method itself is not one of the possible modes of managing wounds, it is the only possible one, the only one worthy of modern surgery." Passing by the fact that there is good reason to believe that the theory of M. Pasteur, upon which Lister bases his treatment, is unsound,‡ some eminent surgeons have by no means met with so favorable results as Lister claims to obtain.

Professor John Wood, in his address, delivered before the last an-

\* Surgical Pathology, pp. 118, 119.

† Lesser on the Antiseptic System. Edinburgh Medical Journal, March, 1874.

‡ The Lancet, Oct. 11, 1873, page 529.

nual meeting of the British Medical Association, relates his experience regarding the antiseptic system of dressing wounds. He has given, he believes, at King's College Hospital, Lister's method a fair trial. As long as the hospital was healthy, wounds treated by the antiseptic method did remarkably well. After a time, erysipelas and its concomitant pyæmia began to show themselves, "and the erysipelatous blush," says Mr. Wood, "appeared with blameworthy impartiality in cases treated in all kinds of ways, and almost as impartially on my own antiseptic side of the hospital, as on my colleague Sir William Fergusson's non-antiseptic side." Mr. Wood came to the conclusion that, in the generality of wounds, we could not, without danger, depart from the old rule of providing a free exit for all purulent and offensive discharges, and that for the want of this, the exclusion of air was not a sufficient compensation.

Dr. George Thompson writes\* that he had used Mr. Lister's methods in his own practice at the Oldham Infirmary, and that at no small sacrifice of time and convenience he had conducted every dressing with the utmost care, but had failed to obtain results in any way better than he had been accustomed to see in dressing by other methods. He therefore visited Mr. Lister's wards to ascertain the cause of his failures. To his disappointment and mortification, he saw cases looking very much like what he had been accustomed to see in other hospitals. In two cases, at least, inflammation and suppuration had occurred after the application of the dressing, and these were explained away in one case by the access of germs, and in the other by the premature removal of a drainage tube. Mr. Lister, in his remarks on these cases, did not for a moment entertain the bare possibility of any failure of the antiseptic system, and the visitors were asked to believe that in these cases putrefaction had been absent, and to observe what an advantage it was to render, as he did, putrefaction an impossibility. Dr. Thompson says he left the wards with the last remnant of his belief in Prof. Lister dissipated to the winds.

Such testimony—and more of a similar purport might be cited—settles, it would appear, the value of Mr. Lister's carbolic acid dressings. Heretofore, he has asserted that the failure of others to obtain as favorable results as his own has been due to the fact that they have not followed his directions in every particular. Both Professor Wood and Dr. Thompson claim to have faithfully complied with Lister's instructions, and to have failed to meet with more success than is obtained by simpler and well-known methods.

Another form of antiseptic dressing is that of cotton-wool. M. Guérin adopted the theory of Pasteur, and, guided by the experiments of Tyndall, which showed that the atmospheric germs were intercepted when air was made to pass through cotton-wool, he made use of this article in the dressing of wounds, hoping thereby to prevent putrefactive changes in them. But as the subject of cotton-wool dressing has been presented in all its bearings to-day,† a passing notice of Guérin's method is all that is now needed.

A favorite method with some surgeons, particularly in the treatment of contused and lacerated wounds of the extremities, is that of immersion in water; either in that which is kept cold by ice, or in that

\* The Lancet, Sept. 20, 1873.

† In a paper by Dr. T. B. Curtis, to appear in a future number.

which is warm. Billroth\* states that he first saw this plan used by his earliest teacher in surgery, Prof. Baum. Billroth himself has often adopted this procedure with satisfactory results. He thinks there may be considerable latitude allowed as to the temperature of the water, adapting it to the feelings of the patient. At first, a lower temperature (54°-68° F.); later, a higher one (88°-95° F.). The immersion is to be continued from eight to twelve days, and after that it may be employed at intervals.

Dr. F. H. Hamilton, of New York, in a paper on "The Use of Warm Water in Surgery,"† advocates the use of warm water as a surgical dressing in preference to cold. In ten cases, embracing a considerable variety of injuries and diseases that demanded surgical interference, he employed, wherever it was possible, submersion of the wounded part in water, at a temperature of about 90° F. Otherwise, fomentations of warm water were applied by means of compresses, and covered with cotton and oiled silk. In most cases of submersion, the part became considerably, or extremely, œdematous, but in no case did any injurious result occur from the presence of the œdema. The average duration of the submersion was fourteen days. The results obtained by the use of warm water in this way were uniformly good.

Probably the choice of the prolonged use of warm or of cold water should depend on the condition of the patient. A strong man meeting with an injury while in full health, in whom we may anticipate powerful reaction, will endure the application of ice-cold water without harm, if not with advantage; while to one who is constitutionally weak such an application cannot be beneficially made. In any case, the use of cold water should not be too long continued, lest the vitality of the wounded part be impaired, and permanent injury be done. It is worth consideration whether, for instance, after amputations, the application of ice, which is sometimes made to the flaps for many hours, may not so diminish their vitality as to favor subsequent sloughing. The application of cold water to a wound, as it is ordinarily made, by simply laying a cold compress upon it, is soon converted, by the heat of the part, into a warm-water dressing, and, if undisturbed, in a little time becomes dry.

Poultices, particularly in hospital practice, are much less used than of old. As Billroth puts it,‡ "Formerly, cataplasms belonged to suppurating wounds as undoubtedly as the lid to the box." They are, unquestionably, of value in many cases, but experience has shown that they are not indispensable in the treatment of wounds. As to charpie, which was formerly, if not now, in use in great and unsparing abundance in Paris in dressing wounds, it is often burdensome to the patient from the quantity employed, and in suppurating wounds it soon becomes a filthy mass.

In contrast to the various methods that have been referred to, an entirely different practice—that of the open treatment—has, of late, been brought to the notice of the profession. In a work by Dr. Krönlein, recently published,§ the author relates the results of the treatment of wounds during two different periods in the surgical wards of the hospital of Zurich. During the first of these periods,

\* Surgical Pathology, translated by Hackley, page 156 et seq.

† The Medical Record, Dec. 1, 1873.

‡ Op. cit., page 160.

§ The London Medical Record, April 1, 1874.

from 1860 to 1867, the wounds were covered in the ordinary way; during the second, from 1867 to 1871, the open treatment was pursued systematically.

For purposes of comparison, the following classification of cases was made: 1. Amputations; 2. Extirpations of the Breast; 3. Compound Fractures; 4. Accidental Surgical Diseases.

The mortality of the two series as regards amputations was:—

	First period.	Second period.
Thigh,	31 in 36, or 86·1 per cent.	10 in 28, or 35·7 per cent.
Leg,	21 in 36, or 58·3 “ “	2 in 11, or 18·1 “ “
Foot,	6 in 17, or 35·2 “ “	3 in 15, or 20 “ “
Upper arm,	10 in 18, or 55·5 “ “	2 in 14, or 14 “ “
Forearm,	4 in 24, or 16·6 “ “	0
Hand,	0	0

The cases of extirpation of the breast showed a mortality of 32·3 per cent. in the first period, and of 13·6 per cent. in the second. The time of healing was 43 days in the former, 67 days in the latter.

Of the cases of compound fracture, 22 in 86, or 25·5 per cent., died under the ordinary treatment; 14 in 65, or 21·5 per cent., under the open.

Pyæmia and septicæmia occurred less frequently during the second than in the first period.

The time of healing was usually longer during the second period.

By the open method, healing by the first intention was not attempted. Care was taken to secure all bleeding vessels; cleanliness and a free exit for the discharges from the wounds were obtained. Stitches, bandages and all dressings were discarded.

Aside from the reduced mortality asserted to be due to the method as practised at Zurich, for purposes of observation and clinical instruction it has great advantages; because the wounds are so readily exposed to full view, and the healing or other processes are so easily seen.

On the other hand, no opportunity is given for the immediate healing of wounds, and there is wanting that support afforded by properly-applied bandages and strappings, which is in itself a comfort to the patient, and an aid to the process of healing. A source of danger at once occurs to the mind, as to whether intermediary and secondary hæmorrhage would not be likely to take place, owing to the want of sufficient support to the divided vessels of the wound. In fact, of several cases treated at the Middlesex Hospital on the open plan, in two this very accident occurred.\*

This question of the open treatment of wounds, or of their closure by dressings, is not of recent discussion. From very early times, we find it occupying the attention of surgeons. Bonetus, in his “Guide to the Practical Physician,” published two hundred years ago,† states that “*Cæsar Magnatus* and *Septalius* following him disapprove of the old way of curing wounds, used hitherto by all physicians and surgeons who every day, at least once, do cleanse and wipe them, and when they have applied new medicines bind them up again. And they blame *Galen* that, passing by the indication of most moment, he was only intent upon the lesser, that is, abstersion of the excrements and filth, the cause that breeds them being neglected, and all care of conserving the temperament and innate heat of the part;

\* The Lancet, April 11, 1874.

† London, 1684. Article, *Vulnera*.

which, and the strength of the part, if they be taken care of, they think there will be a far less increase of excrements. And they think the heat of it will be cherished, and strength will be added to it, if it be hindered from expiring, and its quality be preserved. Which they think they are able to obtain, by making up the defect of a natural covering with a Medicine analogous and familiar to the temper of the part; by means whereof the heat may be cherished, and its quality may be helped by its like. Whence they gather, that for to defend this heat, wounds must be seldom opened, lest the ambient Air do hurt them. But," continues Bonetus, "since the same Persons confess, that most grievous wounds have been cured by the old way of cure, and they cannot deny, but this new one has only place in simple wounds, and where the wounded party is of a good habit of Body, where great Vessels are not hurt, and the Nerves are whole; besides, there are many wounds, by their own confession, which Nature is not able to cure, unless the impediments be removed by a Surgeon, as if the Body be Cacoehymick, whence comes great store of excrements, which cause Pain, Corruption of the Part, Inflammation, Worms, proud flesh and the like: Finally, since the exceptions exceed the rule, which very rarely allow the use of this new way, we must insist upon the old one, approved for many ages."

The ancients sometimes had a faith in infallible and quite complicated methods of healing wounds, similar to that which is presented in modern times, as will be evident from another quotation from Bonetus, which will compare well with some equally elaborated formulæ of these so-called more enlightened days.

"This," says Bonetus, "cures all Wounds, to a Miracle:\* Take of Aqua Vitæ thrice distilled, and well rectified 2 pounds, St. John's-wort, Hyssop, Millefoil, each 2 handfuls, Frankincense, Myrrhe powdered, each 3 ounces. Infuse them 4 days, and distill them in Balneo or in Sand. Keep it. When you have closed the wound, wet it with this water, by pouring it upon the Wound, and laying on Pledgits, wet in it, with Powder of Myrrhe, Mastiche, Frankincense, Sarcocolla Bole-Armenick, Dragon's Blood, each equal parts. Make a powder; and strew it upon the suture wet with water, and apply upon that a Pledgit wet in oyl of Turpentine, and bind it, do not unbind it till the fourth day, and once every day foment the Wound as it is bound, and wet it with the same *Aqua Vitæ*: On the fourth day loose the ligature, and you will find the wound healed; but if you should not find the Wound healed, do the same again, and open it not for 3 days, wet the Wound every day, as before, then loose it, and cure it as before for 2 days."

In view of the conflicting theories, and the various dissimilar practices, recently advocated regarding the dressing of wounds, no apology is needed in calling the attention of even a learned body to the subject, and in presenting anew some practical considerations that may guide us in their proper treatment.

One point to be aimed at should be *simplicity of method*. The less complicated the dressings of a wound are, provided they fulfil all the requirements of the case, the better. The want of simplicity would be a fatal objection to Lister's method, unless it should be proved to be greatly superior in its results to any other. In the open treatment

\* Op. cit., page 660.

of wounds, we have simplicity of method carried to the extreme ; but, not to repeat the seeming objections to the method that have already been noticed, it is not probable that practitioners are quite ready to entirely discard sutures, strapping and bandages in the dressing of wounds. As to the application of bandages, it is well to bear in mind an old saying of Hippocrates, that it is better to apply a number of bandages to insure firmness of dressing, than a single one too tightly.

Another point of the highest importance, the neglect of which is a serious error, is to *provide, in the start, for a free exit for the discharge of any fluid that may form or collect in a wound*. In no case should the edges of a wound be so tightly confined, in their whole extent, by sutures, or otherwise, that a chance for drainage is not secured. This rule holds good for simple incised wounds, even the smallest, and where we expect healing wholly by first intention. This provision for the drainage of a wound does not preclude the proper coaptation of its edges, nor interfere with the promptness of its healing if, fortunately, there should be no accumulation of fluids within it, but will prevent suffering, and perhaps disaster, should such an accumulation occur. We have heard experienced observers say that they have seen more trouble from the neglect of this simple precaution on the part of general practitioners in dressing wounds than from most, if not all, other causes put together. As an instance of this neglect, who has not known, in wounds of the scalp, pus to burrow extensively, dissecting the tissues from the skull in every direction, thereby converting what might have been a comparatively slight lesion into one of the gravest import ?

Another point that we should take pains to secure is *rest to the wound*. Especially is this true of wounds resulting from amputations. Whatever dressing we may at first apply, whether it is dry or moist, we should endeavor, during the first two or three days, to leave the wound as undisturbed as possible. If the bandages seem to be too tightly applied, they may often be partially cut away to loosen, without materially disturbing, the dressing of the wound. In this way, an opportunity is given for its early healing, if such will take place, while the granulations which form on its edges afford a barrier to the passage of septic agents, if such are present in the vicinity of the wound. Whatever views we may adopt regarding the possibility of such a mishap, all of us can but recognize the desirableness that whatever attempts at repair may be going on shall not be impeded by unnecessary interference on our part.\*

The importance of pure air and of cleanliness, equally necessary in all methods of treatment, need hardly be mentioned at this time.

A chief object of this paper, while enumerating some of the more recently promulgated, and at times conflicting, methods of treating wounds, has been to re-state some of the leading principles sanctioned by the most prominent surgeons through all time, which are too apt to be lost sight of while maintaining sensational measures and startling schemes, but which must not be ignored, if the practitioner wishes to escape disasters, and to obtain the best results in any case put under his charge. Though these may be deemed small matters—minor surgery, so called—still the subject often involves serious conse-

\* Vide remarks of Messrs. Savory and Callender on Pyæmia, before the Clinical Society of London. British Medical Journal, March, 1874.

quences to the attendant as well as to the patient, and has the highest classical as well as professional authority for its importance; for, of old, Homer sang:—

“A wise physician skilled our wounds to heal,  
Is more than armies to the public weal.”\*

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\* Iliad, xi. 635-6.

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