REMARKS ON DRY ANTISEPTIC WOUND TREATMENT.

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DURING the past three years I have treated all recent wounds on what I call dry antiseptic principles, and I am so satisfied with the method that I venture to call attention to it. The number of cases of rapid primary union which I have had, both in hospital and in private during this time, and under this treatment, far exceeds anything I had previously seen either in my own or in the hands of others. Although I am not aware of the exact methods detailed below being elsewhere practised, I do not pretend that they are original, and it will not surprise me to learn that many practitioners have adopted precisely the same procedures, or, at least, have been guided in their wound dressing by identical principles.

In the year 1878 it was my privilege to be a house-surgeon under my late colleague, Mr. Sampson Gamgee; and I need scarcely add, therefore, that the principles which animated him in this matter of wound treatment became familiar to myself. At that time, rest, position, and pressure were extolled by him as the "Trinity of the Surgical Graces." Dryness and infrequency of dressings were his guiding rules in practice. Gamgee understood, as did Liston, Syme, Bell, Pott, and Hunter before him, those great primary and essential conditions under which injured tissues most readily heal, and his affection for old surgical authority would not allow him to be carried helter skelter away on the tide of Lister's carbolic sea. He appreciated what was sound in the Listerian method, and accepted it at once; he smiled at the "theory," and jested at the "spray," and how far he was right the practice of many of our leading living surgeons bears ample evidence. Shortly before Gamgee's death he had included a fourth amongst his "Graces," that of antiseptis, although he never attached the importance to it to which it is properly entitled.

Rest, position, and pressure are potent factors for good in the treatment of all wounds, but greater than any one of these is perfect "surgical cleanliness," another term, I take it, for "perfect asepsis." The essentials of wound treatment, therefore, constitute a party of four—a quartette—in order of importance as follows: 1, surgical cleanliness; 2, practical immobilisation; 3, uniform pressure; 4, moderate elevation. Dryness of dressings I look upon as scarcely second in importance to any of the above.

Dominated by these principles, I have by degrees elaborated a method of wound dressing which, in my opinion, nearly satisfies all requirements, but that still further improvements will be added I think is extremely probable.

I will now briefly describe my present method of operating and of subsequent wound treatment, say, for example, in an amputation through the leg. Every patient about to be submitted to any surgical operation ought to have been confined to bed for at least twenty-four hours, and, whatever the nature of the operation, the bowels should have been cleared. These are points to which too little importance is often given.

The parts are shaven of hair, washed with soap and warm water, well scrubbed with a nail-brush, and are then protected with a cloth wetted with weak corrosive sublimate lotion until the moment of operation. The patient is anæsthetised, the tourniquet applied, and the limb exposed. All clothing covering other parts is protected with cloths wrung out of weak antiseptic lotions, chiefly for the purposes of shutting in the "fluff" of the blankets, dressing gown, etc.—one of the most potent "infectors" in operations as frequently carried out—and also for laying artery forceps, retractors, etc., down upon when they are not actually in use.

The hands of self, and not more than two assistants and a nurse, are scrubbed with hot water and soap, care being paid to the recesses about the finger-nails (another common lurking-place for septic matter). Let there be no misunderstanding as to the number of hands which are to come in contact not only with the tissues of the part itself, but, what is more important, with anything and everything which is to be used at any stage of the whole operation. After these hands are cleaned, see that they are not thrust into pockets, nor used to restrain a refractory patient, by seizing other parts of his body than that which is to be oper-

ated on, for here, again, lies another source of infection. Hands are washed, but they are often recontaminated before the operation begins.

Instruments are to be thoroughly washed and scrubbed, and with regard to these I will merely mention the localities in which infective material is most likely to be overlooked: first, the teeth of artery and other forceps; secondly, the eyes of needles; thirdly, the chequered handles of knives; fourthly, the teeth of saws; and fifthly, the chains of *écraseurs*.

Sponges I never use. I fear them most in hospital practice. There is no way of assuring yourself of their cleanliness. Theoretically no objection can be sustained against them, but practically they often betray us. I use instead pieces of new lint, about fourteen inches square, usually two or three being sufficient for major operations. These are swilled out in warm water by the nurse who is assisting.

When the limb is off, free bleeding points are tied with catgut ligatures; capillary oozing is checked with hot water. I always endeavour to stay the last leaking point, but in the majority of cases I am bound to confess that I fail to secure that dryness of surface which theory says is essential to primary union. Small clots between wound areas give me no uneasiness. I have seen Gamgee shut up freely bleeding flaps and still obtain primary union. "Securing the last bleeding point" often means prolonged operation with all its evils, as well as the unnecessary bruising of tissues which follows from the inevitable "mopping" attending the discovery of troublesome points.

Before closing the wound the whole raw surface is thickly covered with finely powdered boracic acid, rubbed gently but thoroughly into the parts, attention being directed to the connective tissue plains around muscles, vessels, and nerves. The procedure is precisely like that adopted by the cook when "salting" hams. Several drachms, sometimes ounces, of the acid are shut up in the wound, and are never seen any more. The "salting" constitutes an essential part of the dry antiseptic process which has given such good results in my hands. Wound edges are sutured sometimes with silk, at others with silver, for which latter, however, I have no preference over fine iron wire.

Drainage is best arranged for when the wound is nearly closed. A finger introduced at this stage discovers the deepest, most dependent recesses, and into these large rubber drainage-tubes are directed, and are brought out as a rule at the angles of the wounds, but sometimes special incisions are made through the tissues and skin of a posterior flap for the purposes of shortening and of perfecting drainage routes. The ends of the tubes are left several inches long, and the dressings arranged so that the ends project outside their outermost layer. In this way all early serous discharge is carried right away at once, and the tubes can be withdrawn early without removing the dressings.

The wound being closed, it is dusted over with powdered boracic acid, and covered by a single strip of lint soaked in a saturated solution of boracic acid and glycerine, outside which are placed two or three thicknesses of Gamgee absorbent tissue, cut and arranged so as to exercise equable pressure over the face of the stump and the lower twelve or eighteen inches of the limb. A simple layer of gutta-percha tissue is next applied, large enough only to extend to a point some two or three inches above the limit of the wound. The whole dressing is now secured by gauze bandages which encircle the limb to its uppermost limit. Mill-board splints, covered thickly with common wadding, are adapted outside the dressing, and are secured with ordinary bandages.

If during the forty-eight hours following operation temperature and pulse remain normal and pain is absent, I simply withdraw the tubes, and leave the dressings otherwise undisturbed. The meddlesome inquisitiveness which directs us to expose all wounds within twenty-four or forty-eight hours simply for the purpose of seeing how they are going on is calculated to do a tremendous amount of harm. Not a few primary unions are spoilt by the practice. It has always appeared to me like to the child who sows seeds in her toy garden, and digs them up next day to discover what progress they have made. Recent wounds should be dressed only in response to three demands—high temperature, quick pulse, and pain. If all are absent, practice teaches me that satisfactory progress is being made, whatever theory would suggest to the contrary. In the absence of any of the above indications, I leave wounds undisturbed from one to four weeks, dressing them only to remove sutures in amputations, tumour excisions, etc., to assure myself of accurate position in osteotomies and joint exsections, or to perform a further step in operations

such as gastrotomy. If primary union is found to have taken place throughout the whole or greater part of the wound, similar dressings are again applied; but if free suppuration has occurred, I abandon dry and infrequent dressings altogether, and use one of several other kinds, particularly adapted to the rapid and continuous and thorough removal of purulent products. In cases with what I regard as "inevitable suppuration"—most sequestrotomies, for example—after the first boracic acid dressing, I am fond of applying pieces of coarse scouring flannel, moistened with carbolic lotion (1 in 40), changed two or three times during the twenty-four hours, and continued until wound surfaces have cleaned and are covered with healthy granulations. I know no material which sucks up discharges with greater avidity.

I have used dry boracic dressings in major surgical operations of all kinds, and primary union has followed in the vast majority of cases. I have opened the abdominal cavity scores of times, the cranial cavity in many instances, and the cavities of joints on numerous occasions, and have never seen more than the roughest trace of suppuration in any of the wounds.

I have had hip-joint amputations soundly cicatrised, and patients sitting up on the twelfth day. Failure to secure primary union in breast excisions comes as a bitter disappointment. I purposely avoid detailing cases in this paper, because I believe that no useful practical end would be served thereby.

My own experience of surgical dressings began at the General Hospital at a time when Listerism had attained what was considered its highest perfection, when operations were performed in a cloud of carbolic steam, and patient, and operator, and assistants practically swam about the theatre in floods of antiseptic fluids. None amongst my earliest teachers had a more thorough conception of what Listerism could do, none followed the precepts of his enthusiastic leader more energetically, no disciple of the germ theory was more conscientious, than the late William Preston Goodall. In his practice I gained my first experience of perfect primary unions after major operations: and without saying my present results are better than what I saw then, I am sure they are as good, and are secured with less labour to the surgeon, with less expense to the hospital, and with less suffering to the patients.

In conclusion, I would add my belief that no small measure of my success is due to the introduction *into* the wound of the non-irritating, non-poisonous, and reliably antiseptic, dry, and absorbing powdered boracic acid.

A CONSECUTIVE SERIES OF OSTEOTOMIES.¹

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THE following list, which has been compiled for me by my house-surgeon, Mr. Berkeley G. Moynihan, M.B., is a consecutive series of osteotomies for genu valgum and bow-leg which have been performed by me during the past three years, with two or three exceptions, in the Leeds General Infirmary.

Full antiseptic details, including the carbolic spray, were carried out. In the cases of genu valgum Macewen's osteotome was employed, the popliteal surface of the femur being first divided, and afterwards the anterior border; the incision on the inner side of the thigh being no larger than just to admit the osteotome. No suture or drainage-tube was ever employed. In straightening the limb, instead of bending the leg inwards to begin with, it was found very much easier to break the portion of the femur undivided by pressing the leg outwards, after which it was easily straightened. In order to secure a straight limb, the leg was always pushed well inwards, even beyond the position it was intended to occupy, and retained there by means of a long splint with a very thick pad at its lower extremity, up to the time of applying the plaster-of-Paris.

In the cases of bow-leg—with two exceptions, in which the saw was used—Macewen's chisel was always employed to remove a wedge out of the tibia, the fibula being then broken without division.

The following is a list of cases:—

TABLE I.—Cases of Genu Valgum.

Name.	Age.	Degree of Deformity.	Result and Remarks.
J. A. ²	16	Between malleoli, 20 inches	Plaster applied 11th day. D 7th day.
H. B.	7	—	Plaster applied 5th day. Temperature normal.
W. B.	17	—	Plaster applied 13th day. Temperature normal.
J. C.	8	—	Plaster applied 8th day. Temperature normal.
J. H. ²	15	Between malleoli, 15 inches	Plaster applied 11th day. Each leg once D.
E. M. ²	8	—	Plaster applied 8th day.
A. P. ²	8	—	" " 9th "
A. S. ²	8	—	" " 10th " Ogston's operation had been performed a year previously.
S. S. ²	15	Between malleoli, 24½ inches	Plaster applied 10th day.
A. A. ²	14	" " 6½ "	" " 9th "
M. W. ²	9	" " 6½ "	" " 13th "
G. B. ²	9	" " 6½ "	" " 8th "
P. B. ²	7	—	" " 11th " Also osteotomy of left tibia.
E. D.	16	—	Plaster applied 11th day.
T. B. ²	19	—	O January 7th. D January 11th, 20th, 22nd (pus 3 ss) and 26th. Small piece of necrosed bone came away. Ultimate result good.
E. H.	16	—	Plaster applied 12th day.
L. B. ²	11	Between malleoli, 6 inches	" " 9th "
J. G. ²	12	" " 8½ "	" " 9th "
W. H. ²	16	" " 9 "	" " 8th "
R. H.	9	" " "	" " 10th "
C. S.	4	" " "	" " 9th "
G. W.	4	" " "	" " 12th "
E. W.	7	" " "	" " 9th "
M. B. ²	15	" " 10½ "	" " 13th "
E. D.	10	" " 3½ "	" " 14th "
A. D. ²	5	" " 8 "	" " 11th "
J. H.	16	" " 6 "	" " 15th "
M. H.	17	" " 3 "	" " 16th " D 7th day.
E. H.	10	—	" " 14th "
F. J. ²	3	Between malleoli, 7 inches	" " 20th " D 8th day.
B. S. ²	23	" " 8 "	" " 26th "
P. S. ²	9	" " 6½ "	" " 12th "
W. T.	10	" " 4 "	" " 11th "
C. V.	14	" " 7½ "	" " 11th " Genu varum opposite leg.
E. W. ²	14	" " 8 "	Plaster applied 23rd day. D 19th day.
E. W.	7	" " 5 "	Plaster applied 16th day. D 8th day.
A. B.	38	" " 18 "	Plaster applied 21st day. Genu valgum opposite leg.
M. A.	17	" " 17 "	Plaster applied 14th day. Left leg less deformed, and corrected by instruments.
J. W. ²	7	" " 5 "	Plaster applied 8th day.
W. L. ²	14	" " 4½ "	" " 7th "
J. A. ¹	12	" " 9½ "	" " 7th "
W. F. ²	16	" " 10 "	" " 11th "
E. F. ²	15	One leg at right angles to thigh	" " 16th "

TABLE II.—Cases of Bow-leg.

Name.	Age.	Remarks.
J. D. ²	7	Right tibia. Plaster 7th day. Left tibia. Plaster 11th day.
F. M. ²	—	Three-quarters of an inch of bone removed from each tibia. Both healed perfectly on 14th day when put up in plaster. Saluber lotion employed, 20 grains to pint.
W. T. ²	11	Wedge from left tibia. Plaster 15th day.
W. T. ²	—	Osteotomy of both tibia. " 12th " on each.
P. B. ²	7	Wedge from tibia. " 10th "
A. H.	6	" " 10 weeks. Suppuration and several dressings. Ultimate result good. Saw employed to divide bones.
E. M. ²	3	Wedge from tibia. Plaster; R. 6th day, L. 7th day.
W. T. ²	11	Right leg. In the infirmary six months. Sinuses formed; the ends of the bone had to be refreshed. Saw employed to divide bone. Ultimate result good.
L. J. ²	3	7 inches between mid points of tibia. Plaster 15th day.
J. M. ²	7	Bowed tibia. Plaster 16th day.
F. B. ¹	14	Extreme bowing of tibia. Plaster applied 32nd day. D 2nd day.

Note.—² After name of patient means both legs operated on. D means dressed. Result and temperature, when not otherwise stated, were good.

In the preceding 84 osteotomies performed on 54 patients, it will be noticed that recovery ensued in every case, and that only

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