

## NOTES ON "CARREL" TREATMENT.

"Carrel" is the antiseptic now so largely used for dressing wounds, and was first discovered or evolved in the laboratories in Edinburgh and Cambridge. It was originally known by the name of its discoverer, Dr. Dakin. It is now prepared commercially in England and sold under the name of Eusol, in the form of two powders, to be mixed and filtered just before use. In France the antiseptic is called after Dr. Carrel, of Compiègne, who has brought it to a high state of perfection.

The liquid is actually a solution of hypochlorous acid, produced by the trituration of chloride of lime (bleaching powder) in a solution of carbonate and bicarbonate of soda. By this means calcium carbonate (chalk) is thrown down and filtered away, and hypochlorous acid left in solution. As this is well known to be an unstable compound, particularly under the influence of light, the antiseptic must be prepared afresh each day.

It has a caustic effect on healthy skin, which must therefore be protected from contact with it. It has also, of course, a strongly bleaching action, the result of the chlorine set free by the decomposition of the liquid.

The following notes are taken from a lecture given by Dr. Depage at the Hôpital de l'Océan, La Panne, Belgium.

"In the course of a visit recently paid to the Ambulance of Dr. Carrel at Compiègne, I was able to note that the treatment of wounds, as at first instituted, has been brought to a high pitch of perfection, the methods have become more and more systematised, empiricism has been left behind, and the results in every case are checked by a bacteriological examination, and by a close study of the progress of cicatrisation.

The following are the essential points of the present treatment:—

(1) Directly the patient enters the hospital, the wound is thoroughly washed with oleate of soda, and, if necessary, prepared for operation.

(2) The cleansing, trimming, and curetting of the wound also take place immediately.

It is still a moot point whether, in the case of fracture, the splinters are to be removed or not. Some operators remove them all. I have also seen cases in an American hospital where the surgeons remove none at all. The practice in Dr. Carrel's ambulance is to remove only those splinters which are almost entirely detached, and only when it appears certain that their removal will have no bad effect upon the consolidation of the bone.

(3) The nerves and tendons belonging to the wound are sutured immediately in spite of the Carrel treatment. The suturing is done with chromated catgut, which remains unaffected by the Dakin solution, so fatal to silk. The Dakin solution does not prevent the union of these nerves and tendons. The wound is naturally left open.

(4) Directly these preliminaries are completed, the Carrel tubes are placed in position. These are always of the same diameter, and are placed freely, to the number of one or more, according to the size of the wound. When it is necessary to place several tubes in one wound or in neighbouring wounds, the mouths of these are connected and fitted into a little glass mouthpiece with several openings.

The wound is not plugged unless there is hæmorrhage, a simple gauze compress being placed over the opening, the tubes reaching to the bottom of the wound, so as to irrigate it completely. Irrigation drop by drop has been abandoned, and injections every two hours, though the latter method has some advantages in certain ambulances on account of its simplicity. The method adopted at present is irrigation under pressure every two hours. The Dakin solution is placed in a special graduated vessel hung above the foot of the bed, and put into communication with the wound by means of a rubber tube. Every two hours the nurse opens the "pince de Mohr" (a clip which closes the tube) and allows to pass a quantity of the liquid proportionate to the size of the wound.

Burns are treated with the same solution applied to the wound on compresses, which are renewed twice a day. On first treating a burn, the solution is used of half the strength on account of the pain; later, the normal strength is sufficient. The efficacy of Dakin's solution has been shown by many experiments, amongst others by a recent case of a patient with multiple wounds. All the wounds save one were treated by the Carrel method, and that one developed gas gangrene.

(5) To avoid burning the surrounding tissues, Carrel uses yellow vaseline spread on small compresses, which are sterilised in an enamel vessel.

(6) To keep the wound clean and help it in its sterilisation, Carrel has the wounds and the surrounding parts washed with a neutral solution of oleate of soda. He does not permit the smallest impurity or concretion to remain on the skin in the neighbourhood of the wound, these being always fertile sources of microbic infection. The wounds in the ambulance at Compiègne are of the most perfect cleanliness.

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