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LOCKE'S SOLUTION AND THE CORNEA

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FOR the past two years I have been experimenting with a solution which as far as I know has hitherto not been used in ophthalmology. The solution contains the mineral salts of the blood with the addition of dextrose and is known as Locke's solution. The solution is used a great deal in physiological experiments. The following is the complete formula :

Sodium Chloride	...	...	...	0.9
Sodium Bicarbonate	...	...	...	0.05
Potassium Chloride	...	...	...	0.042
Dextrose	...	...	...	0.1
Calcium Chloride	...	...	...	0.025

Distilled water sufficient to make 100.

I have found the solution of great value in the treatment of corneal diseases, more especially in cases of corneal traumatism.

I first tried the solution two years ago on a boy admitted to the Birmingham Eye Hospital. The boy was removing a nib from a steel penholder, when the nib suddenly parting from the holder caused the boy to strike the right eye with the holder itself.

On examination it was found that a strip 3 mm. wide and about 5 mm. long had been gouged from the central part of

the cornea. At its deepest part the wound penetrated half the thickness of the cornea. The strip was adherent at one end by a slender filament of epithelium. At first sight the only feasible procedure to adopt was to sever the slender filament and remove the strip completely, allowing the furrow in the cornea to fill up with granulation tissue. This, of course, would have caused a large amount of irregular astigmatism and also a dense scar.

It then occurred to me that a solution containing the elements of lymph, if applied frequently to the cornea, might maintain the vitality of the excised strip and allow it to reunite. The strip of cornea was placed in position and Locke's solution applied hourly during the day, a light pressure bandage being applied during the intervals. In a week's time the strip had re-united and only a very slight opacity was present at the interfaces, the strip of cornea itself being perfectly clear.

The Locke's solution was used double strength and was oxygenated by passing in oxygen gas from a cylinder. The solution was used double strength in order to combat the dilution effect of the lacrymal fluid. No other treatment except the Locke's solution was employed.

Recently I have had such remarkable results with corneal abrasions that I thought it justifiable to record some of the cases. A young lady was struck in the right eye with a tennis ball. Her vision was reduced to less than 6/60. Almost the whole of the cornea stained deeply with fluorescein and with the slit-lamp it was found that the epithelium was denuded from almost the whole of the staining surface, small shreds of epithelium only being adherent here and there. A few pigment cells were visible floating in the aqueous humour. The fundus was apparently normal, but could not be focussed sharply owing to the irregularity caused by the abrasion.

Locke's solution, double strength, but without oxygen, was instilled two-hourly. In seven days' time the cornea was entirely covered with epithelium, there was no staining with fluorescein, and vision was 6/6.

A man, aged 50 years, attended St. Paul's Eye Hospital, Liverpool, complaining of great pain in the right eye. He had been struck in the eye with a tennis ball the day previously. His vision could not be taken as the eye was blind owing to an accident thirty years ago. On examination it was found that the cornea stained deeply with fluorescein over a large part of its surface. A 5 per cent. silver proteinate salt with 1 per cent atropine was ordered and a light pressure bandage applied. In a week's time there was no improvement, and quinine was substituted for the silver salt and used for a further period of four days. The cornea showed no signs of regenerating its epithelium and the patient was suffering

from much pain. Double strength Locke's solution was then ordered and in three days' time the patient reported at the hospital when it was found that the cornea was almost completely covered with epithelium and only stained in one small area. I have also treated with satisfactory results indolent corneal ulcers.

As the cornea depends for its nourishment on the lymphatic supply I think it quite reasonable to assume that a solution having a similar composition to lymph, as far as the mineral salts are concerned at any rate, will have a beneficial action when applied frequently to the cornea. The beneficial action being to hasten the reparative processes will chiefly manifest itself in the superficial layers of the cornea.

RETROBULBAR NEURITIS ASSOCIATED WITH SINUSITIS, OPERATION, RECOVERY

BY

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FEMALE, aged 21 years (E.H.) was seen August 11, 1926. Patient complained of right eye being blind for one month. The patient said that a month ago she had pain on moving the eyeball. This commenced suddenly and was also associated with an acute nasal catarrh, and the condition lasted three weeks. During this time she had difficulty in looking inwards. Her grandfather became blind at the age of 38 years. On examination:—without lenses: V.O.D. fingers at two metres; without lenses: V.O.S. 6/10. With lenses: V.O.D. 6/60; with lenses V.O.S. 6/10.

A central and paracentral scotoma was discovered on the Bjerrum screen for red, green, and blue.

The edge of the optic disc was hazy on nasal side and the nasal blood-vessels near the disc were indistinct. The left optic disc and fundus were perfectly clear. Examination of the nose showed a deviation of the septum to the right in the region of the middle turbinate, but no sign of hypertrophy or oedema of the mucous membrane was present. No pus was seen and the frontal and maxillary sinuses were clear on transillumination. On account of the central scotoma, history of involvement of the muscles which lie to the inner wall of the orbit, and the history of acute nasal catarrh (although the latter did not occupy a prominent place in her mind) operation was offered. The patient accepted operation and, on August 13, I removed the middle turbinate and opened the sphenoid and posterior ethmoid cells (with Sluder's