REFERENCES

- Campbell, J. (1944). *Brit. dent. J.*, 77, 159.
 Clark, H. B. (1947). *J. oral Surg.*, 5, 348.
 Fisher, A. K., and Rashid, P. J. (1952). *Oral Surg.*, 5, 191.
 Guardo, R. C. (1945). *Dent. Dig.*, 51, 635.
 Hecht, S. S. (1939). *Amer. J. Orthodont.*, 25, 574.
 Holland, D. J. (1949). *J. oral Surg.*, 7, 75.
 Runnerstrom, G. (1940). *Northw. Univ. dent. Res. Bull.*, 40, 15.
 Simmons, H. T. (1941). *British Medical Journal*, 1, 119.
 Stones, H. H. (1951). *Oral and Dental Diseases*, 2nd ed. Livingstone, Edinburgh.
 Thoma, K. H. (1941). *Oral Pathology*. Kimpton, London.
 — (1952). *Oral Surg.*, 5, 214.
 Vandory, W. (1937). *Z. Stomatol.*, 35, 1184.

SIMPLE DEPRESSED FRACTURE OF THE SKULL

BY

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Whether or not to advise elevation of a simple depressed fracture of the skull which is symptomless is a recurring, albeit an infrequent, problem. Most depressed fractures are compound, and the indication for operation in these cases is absolute.

When a child is seen with a slight depression, an unbroken scalp, and a complete absence of symptoms, there may be a natural inclination on the part of the medical adviser and the patient's relatives to leave well, or what is apparently well, alone. X-ray films may merely confirm the depression and the electroencephalogram may be normal, but nevertheless a piece of the inner or vitreous table of the skull may have been driven through the dura mater into the brain. This is illustrated in the following case.

Case 1.—A boy aged 9 fell from a swing and dented his left parietal region. He was unconscious for about 20 minutes and then recovered completely and walked home. When seen at the Cardiff Royal Infirmary some five months later he had no symptoms and presented no abnormal features except a shallow depression in the left parietal region which was confirmed by x-ray examination. The nervous system was normal, as was also the electroencephalogram. At operation an in-driven fragment of the inner table of the skull was found to have penetrated both dura and brain, and to have anchored the brain at the site. A flap of bone, including the depression, was removed, reversed, and replaced after cutting away the projecting bony fragment which had entered the brain, and after smoothing the rather uneven surface of the inner table, which was now lying outwards. The boy made a good recovery, and it was concluded that freeing the anchored and developing brain was desirable in order to avoid possible complications in the future.

Depression in the Newborn Child

At birth and in infancy the skull bones are so soft that in these cases there is indentation without fracture, but it is convenient to regard them in the same category, as they are examples of traumatic depressions nevertheless.

Case 2.—A male baby delivered by forceps had a deep indentation in the left fronto-parietal region. He appeared in all other respects normal, and was seen at intervals until 2

months old; but as during this time there was no indication of the restoration of the normal contour of the skull by the disappearance of the indentation, this was effected by operation, with a satisfactory result. After turning down the scalp, a flap of bone was cut with scissors and with the thumbs the depression was pushed out and the osteoplastic flap replaced. The baby thrived and now has a skull of normal appearance, and what was a considerable reduction in intracranial capacity due to the deep indentation has been restored to normal.

Diagnosis of a Simple Depressed Fracture

A depressed fracture is usually obvious, but is not always so, especially if lying beneath the temporal muscle and its overlying fascia. In these circumstances x-ray examination in strictly antero-posterior as well as lateral planes may also fail to detect the depression. Films taken after slight rotation of the skull will make it obvious, however, as in the following case.

Case 3.—A naval stoker aged 26 fell from a plank on to the quayside at Cardiff docks and lost consciousness, which he regained in an ambulance on the way to hospital. He developed a swelling over the right side of the forehead, on which there were some abrasions, and the left eye showed subconjunctival haemorrhage. No depression could be felt, but slightly rotated antero-posterior views of the skull showed a depressed fracture underneath the left temporal muscle. Six days after his admission to hospital the depressed part of the left squamous temporal bone was elevated after first reflecting the temporal muscle. Recovery was uninterrupted.

Any error in diagnosis is usually in the opposite direction, of suspecting a depressed fracture when none exists, and what is felt and thought to be a depressed fracture is in reality a haematoma with a soft centre and firmer periphery.

Operative Treatment

If a depressed fracture is compound the question of whether to operate or not does not arise. Operation is indicated, as it is in the case of compound fractures occurring elsewhere in the body, and for a similar reason. It is suggested that simple depressed fractures should likewise be operated upon. Two points in technique may be referred to. (1) It is advisable to operate early, before union has taken place. In this early phase the bony fragments can be elevated, but after union has occurred this is no longer possible. To try to lift up the depression, which is really a reversed bridge, is like applying pressure to the arch of a cantilever bridge, and is quite futile. In this phase a block of skull comprising the fracture should be removed, reversed, and replaced. (2) The best way to deal with the indented skull of the infant is to cut out a flap of bone with a pair of scissors, reflect it on its base as a hinge, press up the depressed area with the thumbs, and replace the flap.

Drawing of baby boy aged 2 months with persistent depression in left frontal region (Case 2).

Conclusions

Further cases might be quoted, but these serve to illustrate that simple depressed fractures should be elevated to restore the contour and capacity of the skull and to free what may be an anchored brain in the hope of avoiding future complications such as epileptic attacks. Early operation is advisable; not urgently as in compound fractures, but at a time convenient to patient and surgeon. Secondly, in the case of fractures in the temporal region, depression should be suspected and special x-ray examination made to ascertain whether it is present and masked by the temporal muscle and a tense overlying temporal fascia. Lastly, deep depressions in the skulls of the newly born should be pressed out within a few months of birth, if during this time no tendency is observed for natural restoration to take place.

I am indebted to Miss J. M. Williams, of the Welsh National School of Medicine, for the drawings.

TEEPOL IN THE PREPARATION OF SPUTUM FOR TUBERCLE CULTURE

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Demonstration of tubercle bacilli in sputum is necessary for diagnosis and for controlling risks to contacts, and is also, owing to recent developments in chemotherapy, of increasing importance in assessing treatment. Thus identification of this organism constitutes a growing duty of public health laboratories.

Pottenger (1930-1) showed that microscopical examination of a Ziehl-Neelsen film for 10 minutes will reveal less than 88% of positive specimens. The value of selecting a purulent portion of sputum for preparing films has been re-emphasized by Spendlove *et al.* (1949), who clearly demonstrated the superiority of this procedure as compared with concentration by alkali treatment and centrifugation, which seems to reduce the acid-fast properties of the organism. Corper (1928) stated that over 100,000 tubercle bacilli must be present per millilitre of sputum before they can be detected microscopically in a fairly thick film, while according to Cruickshank (1952) the number is from 10,000 to 50,000. Thus adequate direct examination of sputum films is time-consuming, and even when thoroughly carried out some 10% of positive specimens probably escape detection. Culture methods also have their defects, and some microscopically positive sputa fail to yield growths. Cruickshank noted as high as 27% failures with weakly positive sputa in general, and 68% when chemotherapeutic agents had been administered. However, it is clear from the work of Dubos (1946) that the tubercle bacillus is fickle in its reaction to artificial nutrient environments.

Direct examination and culture are complementary, and should be carried out in parallel in order to minimize false-negative results. This is all the more important since the valuable method of guinea-pig inoculation can be performed only on a limited scale and also has its failures. Recently the Public Health Laboratory Service Working

Party on the Diagnosis of Tuberculosis (Report, 1952) described very thorough experiments to determine which of four techniques for homogenization and culture of sputum yielded the greatest proportion of positives, and concluded that "sodium hydroxide proved significantly better than any other methods." We have obtained promising results by a different method which is exceedingly simple and rapid as compared with the alkali technique.

Method

The detergent "teepol," stated by the manufacturers to be a solution of sodium higher alkyl sulphates, was used to homogenize the specimen and kill contaminants. Trial sputa, mainly from sanatorium patients and received after one to three days in transit, consisted of 3-10-ml. specimens in 1-oz. screw-cap universal containers with "blackol" liners. First a direct smear was stained Ziehl-Neelsen and examined for five minutes by each of two people. The number of tubercle bacilli found in positive films during the 10-minute search varied from abundant to only one or two. To each specimen was then added an equal volume of teepol, the mixture being shaken once or twice for a few seconds and kept at room temperature for six hours in the case of a third of the specimens, the others being left for 24 hours. The result was a homogeneous and syrupy mixture. The whole surface of a slope of Löwenstein-Jensen medium in a universal container was inoculated with three small (2-mm.) loopfuls of each mixture and kept at 37° C. for six weeks.

Results

Of 142 specimens, 41 were positive microscopically, and growths of tubercle bacilli were obtained from all but one of the latter. Of the 101 microscopical negatives, eight proved positive on culture, two of which were examined for virulence and found to be virulent to the guinea-pig. Three further specimens, microscopically a positive and two negatives, were discarded because of contamination. Growth was usually observed in the third or fourth week.

It is not yet known whether the shorter exposure will yield a larger proportion of positive results, or whether the carry-over of a small amount of detergent benefits the culture, but apparently it is not harmful. The effect of larger inocula has yet to be tried. A 50% watery dilution of teepol often fails to homogenize and so to sterilize even in 48 hours, coliform organisms and yeasts mainly surviving. The method is apparently applicable to other types of specimen, urines having been successfully cultured.

REFERENCES

- Corper, H. J. (1928). *J. Amer. med. Ass.*, **91**, 371.
- Cruickshank, D. B., Sellors, T. H., and Livingstone, J. L. (1952). *Modern Practice in Tuberculosis*. Butterworth, London.
- Dubos, R. J., and Davis, B. D. (1946). *J. exp. Med.*, **83**, 409.
- Pottenger, J. E. (1930-1). *J. Lab. clin. Med.*, **16**, 985.
- Report (1952). *Monthly Bull. Minist. Hlth, Lond.*, **11**, 187.
- Spendlove, G. A., Cummings, M., and Patnode, R. A. (1949). *Pub. Hlth Rep., Wash.*, **64**, 574.

The seventh annual report of the Institute of Child Health (University of London) includes an account of research undertaken or projected at the Institute during 1952. In January a full-time physiologist was appointed and is at present engaged on investigations of renal function. The Institute has undertaken supervision of the Population Investigation Committee's survey of growth and development being carried out by Dr. J. W. B. Douglas. At the Child Study centre the investigation into normal growth and development is proceeding, and the report of the results of the pilot survey was produced during the summer. Improved techniques of measurement have been introduced; x rays have been used to determine tissue depth, and an accurate method for assessing this has been determined. Dr. A. P. Norman has continued his clinical investigations of fibrocystic disease of the pancreas and (with Dr. L. I. Wolff) of hepatic and renal function in full-term and premature neonates. Dr. J. Dean and Mr. D. I. Williams have continued their work on nocturnal enuresis.