CRANIOPLASTY WITH ACRYLIC PLATES

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The purpose of this presentation is to record the authors' experiences in 70 cases of skull defect repaired by acrylic plates made at the time of the operation by means of an impression technic.

Any method of repairing cranial defects should achieve a satisfactory cosmetic result while minimizing difficulty of the procedure, and any material used should be of sufficient strength to assure permanency of repair while achieving satisfactory cosmetic results, and such a material should produce a minimum of foreign body reaction in the tissues. Since the advent of World War II, because of the increased incidence of cranial defects, neurosurgeons of this and other countries have searched for a material that would meet these specifications. Fulcher† advocated the use of tantalum plates and described their successful application in patients. Since that time, the material has been extensively employed, both in military and civilian practice.

Our work was started at Fitzsimmons General Hospital, Denver, Colorado, by Major Joseph M. Cameron, M.C., A.U.S., and the technic has been modified and improved by the authors at Fitzsimmons General Hospital and at Newton D. Baker General Hospital, Martinsburg, West Virginia. Much credit must be given to the dental departments of both hospitals for their close cooperation.

The material chosen for study was a plastic, methyl methacrylate, the polymer of methyl alpha acrylic acid esters, commonly known as acrylic. The properties of the acrylic resins have been studied extensively and are well known.§ Gurdjian, Webster and Brown reported the use of an acrylic plate in one case,|| and Kerr mentions seven cases in which he employed acrylic plates in England.||| Experimentally, the material has been employed as observation windows in the craniums of monkeys by Shelden, Pudenz, et al. Early tissue studies with methyl methacrylate indicate that there is practically no tissue reaction to the substance in experimental animals.¶,¶¶

A technic was evolved which effected satisfactory cosmetic results (Figs. 1 and 2) and the material has produced a minimum of foreign body reaction in the tissue. Based on a series of 70 cases, we have concluded that acrylic may be safely used for the repair of cranial defects.

When the work was started, it was necessary, because of technical difficulties, to perform the cranioplasty in two stages, usually on successive days, and to employ a general anaesthetic. Recognizing that valid objec-

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tions would be raised to any procedure that required reopening a wound that had been sutured 24 hours previously, we succeeded in perfecting the technic so that the cranioplasty may be performed in a single procedure. In addition, we no longer employ a general anaesthetic, but resort to procaine

![Fig. 1. Front and side views demonstrating the defect in the frontal region, involving the nasal process (preoperative).](image1)

Fig. 2. Front and side views of same patient 2 weeks postoperative.