Surgical Treatment

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Treatment in Infancy: Calvarial Surgery

In syndromal and in nonsyndromal cases of craniosynostosis, treatment is directed at the correction of the fused sutures and resultant **head deformity**. This can be achieved by osteotomies, reshaping the head and osteosynthesis, mostly with resorbable material. It is necessary to widen the skull in the area of the reduced growth, due to the fused suture(s). It is also necessary to remodel the skull bones in order to achieve a normal skull shape. In multiple synostoses, the surgery may be performed in one step or in two steps with one surgery limited to the anterior part and the other to the posterior part of the head (or vice versa). An alternative is osteotomy and widening using springs or endoscopic opening of the sutures in combination with head-forming helmet therapy.

Treatment at a Later Age: Midface Surgery

In syndromal synostoses the treatment of the **midface deformity** is usually done at age 4–8 years, but may be delayed if functional problems are minor. Conventional surgical advancement of the midface requires numerous osteotomies of the facial skeleton and advancement of the midface. Metal osteosynthesis is used to stabilise the new position. The produced gaps are partially bridged with bone transplants. In the growing patient, the osteosynthesis material has to be removed. The alternative is osteogenesis distraction. It allows even further advancement as it stretches the soft tissue stepwise. No osteosynthesis is needed but the distractor has to stay in place for at least 2 months, then it is removed.

Surgery to correct craniosynostosis can be done at any age. The ideal time is between 4 and 12 months of age as the brain grows fastest in the first year of life and may be limited in its expansion by the fused sutures. With early operations, the skull is less rigid and easier to shape. Resultant bony defects will be easier to fill with new bone. Compensatory growth in the nonfused areas will later on further aggravate the deformity. Operating at a later age may be slightly safer, as excessive blood loss is the most common severe complication, and blood loss might be easier to handle if the infant is bigger.

The surgical procedures shown in the following pages demonstrate a method of osteotomies used by the author in a systematic way in all types of synostosis and may be extended from the forehead procedure to a whole skull procedure, as needed. It can be applied to mild and severe forms of deformity and rarely needs a variation in osteotomy lines.

The method will be explained in full remodelling first. Then the limited approaches will be shown.

The first part of the access is the same in all types of synostosis. The exposition of the skull varies according to the need. The patient is in a reclined position. The head is free, dressing confined to the neck. Intubation is nasal. The tube is sutured to the septum. In lambdoid suture correction the patient can be placed in a prone position. The head is shaven.

M. Rasse, *Surgery of Craniosynostosis and Related Midface Deformities*, https://doi.org/10.1007/978-3-031-49102-3_3