



Department of Biomedical Engineering
Graduate Seminar



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Subject: Technical Considerations of Calvarial Vault Remodeling in Young Children

Abstract:

Craniofacial and calvarial vault deformities are common in children and infants. Skull deformity may occur due to extrinsic forces which may mold the calvarial vault. Infants with plagiocephaly caused by molding may be treated with cranial molding helmets, which are patient-specific helmets created for each infant. Cranial molding helmets have been proven to be effective in the correction of plagiocephaly in infants.

However, skull and craniofacial deformity in infants may also be caused by intrinsic factors which affect bone growth and development. This is called craniosynostosis or the “coming together of skull bones”. Intrinsic forces which may be influenced by genetic mutations, metabolic or biochemical factors. Infants with these deformities typically present with more severe craniofacial abnormalities caused by skull suture fusion. Typically, normal skull growth depends on open and movable, fibrous sutures which separate the major calvarial vault bones. When sutures between skull bones become calcified and fused, the normal skull growth pattern is disrupted. Growth trajectories shift and the skull becomes abnormally shaped. For these infants, surgery is done to open the sutures.

In young infants, endoscopic or minimally invasive surgical opening of the sutures can be done. In older or more complex infants, an open or more invasive surgery is performed to remove most or all of the skull bones, and then a reconstruction of a normal skull shape is done.

In craniosynostosis and in other skull deformities, surgeons need to fix the skull bones in place in order for proper healing. Additionally, in some infants with head trauma, all or some parts of the skull bones need to be completely replaced. Cranioplasty in infants presents a challenge, because most skull replacement materials do not grow “with” the infant’s skull.

I will discuss the nuances of skull surgery for infants and explain the differences in plagiocephaly and craniosynostosis. I will review the material available now for cranioplasty and osteo-fixation in the skull of infants. I will show some surgical cases and discuss the challenges of caring for infants with skull deformity

Date and time: Friday, October 9th, 2020 11:30 AM

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