

ROBOTIC TRANSFER OF A PREOPERATIVE PLAN FOR OPEN RECONSTRUCTIVE CRANIOSYNOSTOSIS SURGERY: A PILOT STUDY

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ABSTRACT

Open cranial vault reconstruction (OCVR) is a major surgical procedure that could be used to treat craniosynostosis patients. Using preoperative three dimensional (3D) virtual surgical planning (VSP), could assist the surgical team to determine the optimal surgical strategy for every individual patient. However, it remains challenging to transfer this surgical plan to the patient. Therefore, this study has explored the possibility of using a robot during this complex task. The Adept Viper s850, a six degrees of freedom robot, was used to overcome the shortcomings of all current methods and transfer the VSP on a phantom of a patient with trigonocephaly. After manual calibration the coordinates of the VSP were transformed into robot coordinates and used to navigate the robot. The results demonstrated that the robot was able to draw the VSP precise, fast and automatic. The first results of this pilot study are promising. Nevertheless, adjustments have to be made to reduce operating time, complying with all safety standards of medical robotics, and make the robot easier to operate. After completing these improvements, this study shows a large potential for the clinical implementation of robots in OCVR for patients with craniosynostosis.