

### 3D Printed Surgical Guides in Orthognathic Surgery—A Pathway to Positive Surgical Outcomes



Chitra Chakravarthy, Sanjay Sunder, Santosh Kumar Malvata  
and Anmara Tahmeen

**Abstract** Rapid advancements in robotics and computer-aided surgeries have revolutionized the field of medicine and surgery. Maxillofacial surgery has benefited from these technological advances as significant contributions have been made in the management of complex soft tissue and bony pathologies. These technologies are especially useful in patients with post-traumatic defects and also cases with esthetic facial deformities. Defects in the craniofacial skeleton are of either congenital, developmental, traumatic, or pathological etiology. The primary purpose of correcting facial anomalies is for functional rehabilitation. The esthetic rehabilitation of a patient is very challenging. It is important to achieve excellent postoperative form and function and also to minimize operative and postoperative morbidity. Rapid prototyping biomodels that are being used in recent times are playing a very significant role not only for patient education, diagnosis of defects but also in surgical planning. Their use in surgical planning reduces anaesthetic time, reduces operating time, and provides better esthetic and functional results. The integration of 3D imaging and computerized surgery continues to bring about newer and better changes in the conventional surgeries making the outcome much more beneficial to the patient. [1] We present a case of facial deformity in the form of maxillary excess and retrognathia corrected using orthognathic surgery supported by the use of surgical guides fabricated using additive manufacturing.

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© Springer Nature Switzerland AG 2018  
D. Paviani et al. (eds.), *Proceedings of the International Conference on ISMAC  
in Computational Vision and Bio-Engineering 2018 (ISMAC-CVB) Lecture Notes  
in Computational Vision and Bio-Engineering*, 31  
https://doi.org/10.1007/978-3-319-60668-5\_118

Springer

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## Mandibular Repositioning Appliance Following Resection Crossing the Midline- A3D Printed Guide

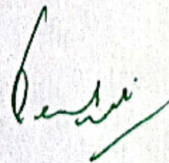
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### Abstract:

Additive Manufacturing (AM) is one of the latest manufacturing processes which has evolved dramatically over the past three decades. The benefits of AM have steadily stepped in to almost all modern industries. The medical and dental industries may have benefitted the most in this regard. In the medical industry, every complex surgery has unique requirements in planning or execution, where it needs customized surgical guides or tools. In patients with mandibular tumors where a surgical resection is performed crossing the midline, currently there is no guide or tool available for repositioning the mandible to the patient's original anatomy. To overcome this, an attempt has been made to develop a customized repositioning appliance, which can be used for pre surgical planning and the same can be transferred to the patient during surgery. The repositioning appliance is developed using the patient's CT data which is then processed with the use of medical translation software. The final patient specific repositioning appliance is fabricated using AM technology. This guide has been used on the models of the jaws requiring resection to check their efficacy and the condylar repositioning has been seen to be close to the pre-surgical position. This appliance is useful for pre-surgical planning, pre-bending and adaptation of the reconstruction plate to the mandible and also to reposition the condyles to their original positions after the resection.

**Keywords:** Additive Manufacturing(AM), Mandibular Resection, Reposition Appliance, Complex surgery.



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*Branch Office*

2/25, Ground Floor, Arun House

Daryaganj, Ansari Road

New Delhi – 110002, India

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1st edition 2004, 2nd edition 2011, Reprint 20

Reprint 2016, Reprint 2017, 3rd edition 2020

ISBN: 978-81-8191-511-5

Dr. GIRISH KATTI M.D.S.

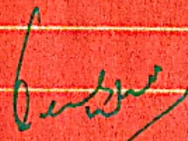
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Durai Pandian  
Xavier Fernando  
Zubair Baig  
Fuqian Shi *Editors*

Proceedings of the  
International Conference  
on ISMAC in Computational  
Vision and Bio-Engineering  
2018 (ISMAC-CVB)



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# TEXTBOOK OF ORAL AND MAXILLOFACIAL SURGERY

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Third Edition

