

Clinical Application of Three-Dimensional Printing Techniques in Contour Surgery of Mandible

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INTRODUCTION: Mandibular contour surgery has been a powerful tool to reduce the width of lower face and create an oval shape that's more appealing to Asian women. Intra-operative approach, which spared the transcutaneous incision and avoided the possibility of scar formation, has been the mainstream method of operation. However, due to its limitation of operative field and inaccessibility of gonial angle, it's hard to resect an accurate amount according to pre-operative planning. Thus, we transformed the pre-operative CT scan into three-dimensional templates, to see if it can help reduce the complication caused by over- or under-resection.

OBJECTIVES: We present our experience of mandible contour surgery with the assistance of 3D-printing for pre-operative survey and intra-operative guidance.

MATERIALS & METHODS: From March 2013 to May 2014, 69 patients received contour surgery of mandible under the assistance of three-dimensional printing. Patients' skull templates were obtained during pre-operative evaluation. After discussing with patients, resection margin was marked on the template and translated to operative field during operation. Drainage tubes were inserted at each side and removed on the next morning.

RESULTS: Most of patients (92%) were satisfied with the result. No major complications, such as overt excision or nerve severance, were noted. Resected bone segments were compatible with pre-operative designs and few contour irregularities were complained.

CONCLUSIONS: Three-dimensional printing skull templates from pre-operative CT scan are beneficial to mandibular contour surgery in three ways: 1. It can assist pre-operative counseling and help patients have better understanding of the exact anatomy of his/her mandible. 2. It helps surgeons with pre-operative plan and designing the osteotomy line. 3. It offers the complete detail of mandibular border, gonial angle with its relative position to mental foramen and oblique ridge. Besides, it can better simulate the intra-operative view that surgeons will encounter during the operation and provide a better guidance while minimizing the possibility of nerve injury or over-resection.

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