Orthognathic Surgery Planning on 3-Dimensional Stereolithographic Biomodel

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Abstract

Background
The success of orthognathic surgery depends on the exact planning based on precise diagnosis. Recent advances in 3-dimensional medical image computing have enabled orthognathic surgery planning on stereolithographic biomodels. In this case, the use of 3-dimensional stereolithographic biomodel was presented in the orthognathic surgery of a patient with maxillary retrusion, mandibular prognathism and midline shift.

Methods
A patient with class III malocclusion was referred to our department with the class III malocclusion. Stereolithographic biomodel was constructed. Le Fort I and bilateral sagittal split ramus osteotomy were simulated on the biomodel according to the cephalometric analysis. Axial gaps which were occurred due to the rotational movement of the distal mandibular segment, were filled with wax at both sides (Figure 1).

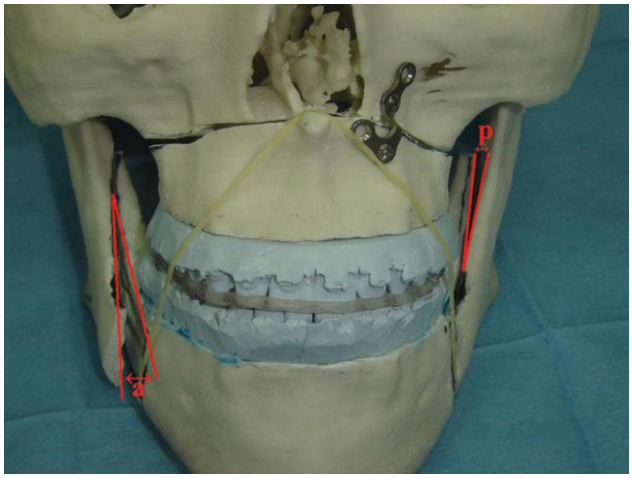

Figure 1. Triangular anterior (a) and posterior (p) axial gapping are emphasized.

The acrylic templates were created to determine the size of the bone grafts. Le Fort I and bilateral sagittal split ramus osteotomy were performed according to preoperative planning. Triangular axial gaps were filled with bone grafts which were prepared by using excess bone cut off from the mandible in accordance with templates (Figure 2).

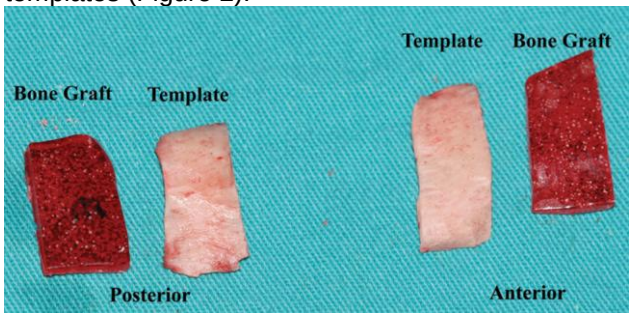

Figure 2. Templates and the bone grafts constructed for the gaps.

Results
The postoperative period was smooth. Long-term skeletal relapse were not observed during the follow up period of 2 years.

Conclusions
Bone graft is a reliable method for functional rehabilitation of the mandible but it rather elongates the operation time. Stereolithographic biomodel is a valuable tool to plan the orthognathic surgery and to prepare a template for the construction of the bone graft. This technique facilitates the operation procedure and shortens the duration of the surgery.

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