

Evaluation of the efficacy of in-house printing to manage maxillofacial defects in microvascular surgery

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Reconstruction of the Midface and mandibular region is still a challenging problem. Complex maxillo-mandibular three-dimensional reconstruction is crucial with regards to occlusion, function, and aesthetic appearance. Virtual 3D planning has become routine tool in daily practise.

From 2017-2022 totally 44 patients included in the study at the Clinic for Maxillofacial Surgery, School of dental Medicine, University of Belgrade. 3D Slicer, 3D studio max Autodesk software were used. Printing technique was fused deposition modelling (FDM). The 39 patients were treated by free flaps and 5 treated by iliac crest flap. Among group of 11 patients who were treated with implants 8 pts got in simultaneous manner with free flap transfer (fibular free flaps (composite and osseal), scapular tip flap, (deep circumflex iliac artery) DCIA. The iliac bone graft was used in 5 cases of mandibular ameloblastoma.

The technique and cases are demonstrating the utility of 3D preoperative planning. 3D bio models and 3D printed surgical guides (PLA) used for fibular osteotomies, DCIA and scapular flap with short bicon implants insertion. The average ischemia time within the target group of pts was 126 minutes. The average time of surgery was 10.09 hours. The postoperative course was uneventful. Average duration of hospitalisation was 8.5 days. The success rate was 100%.. All opened implants were Osseo integrated (100%).

This study showed adequate precision of virtual planning in head and neck reconstructive microsurgery and free grafts planning. The usage of PLA guides is safe and optimal tool for intraoperative simultaneous osteotomies and resection and implants insertion.

The future directions in maxillofacial reconstructive microsurgery should be focused on inhouse software and printers development.