

Virtual Surgical Planning in Free-Fibula Mandibular Reconstruction

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Abstract

Reconstruction of the maxillofacial region has always been a challenge owing to the complexity of function & esthetics. Since its introduction by Hidalgo in 1989, the free vascularized fibula flap due to its versatility and reliability is considered the gold standard for mandibular reconstruction. When reconstructing a mandible due to oncological, developmental or traumatic defect with fibula, the traditional free-hand technique requires high-precision skill for hand-crafting the bony flap to achieve adequate adaptation to the defect. This can be time-consuming in complex defects requiring multiple osteotomies to fully restore the curvature of the mandible and can also frequently lead to imperfect functional and aesthetic outcomes.

Head and neck microsurgical reconstruction has evolved considerably in the last two decades with the development and popularization of three-dimensional (3D) approaches involving virtual surgical planning (VSP) and computer-aided design and manufacturing (CAD-CAM). Using this approach, stereolithographic 3D models of the mandible and the fibula are obtained preoperatively from computer tomography scan data. Each step of the operation including the osteotomies on the mandible and the fibula is preplanned using staged cutting guides. Subsequently, prebent reconstruction plates are used for fixation of the osteotomized & contoured fibular graft to the native mandible thereby increasing the accuracy and decreasing the duration of surgery. Though this method of computer-assisted mandibular reconstruction (CAMR) involves increased presurgical planning and higher costs, it permits more accurate & predictable results with an adequate bone-to-bone contact and reduces overall costs by shortening the operation, decreasing the ischemia time and reducing the postoperative complications. Additionally, virtual surgical planning during mandibular reconstruction allows implant prosthetic rehabilitation to be successfully integrated in the primary reconstructive program in order to place fibular segments in the optimum position both for masticatory function & aesthetic facial appearance.

Biography:

Amarjeet Gambhir graduated in dentistry from GDC, Indore in 2002 & completed his post-graduation in Oral & Maxillofacial Surgery from NHDC, Mumbai in 2006. He completed his 3 year Senior Residency from Lady Hardinge Medical College & Hospital, New Delhi in 2009. He then worked as a faculty at different dental colleges and was promoted to Professor, Oral & Maxillofacial Surgery in 2016. He again joined Lady Hardinge Medical College as a Faculty in 2016. He has worked as a co-investigator in pilot project on school-based sealant programme 2017 under Ministry of Health & Family Welfare, Government of India. He is a reviewer of various international journals & has published more than 15 national & international papers in indexed journals. He has attended a number of conferences & workshops and presented more than 12 papers & key-note lectures in national & international conferences/webinars. He has also authored 3 books for dental postgraduate entrance examinations. His areas of interest include oral cancer, TMJ disorders, maxillofacial pathology & reconstruction, maxillofacial trauma & dental implants..

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