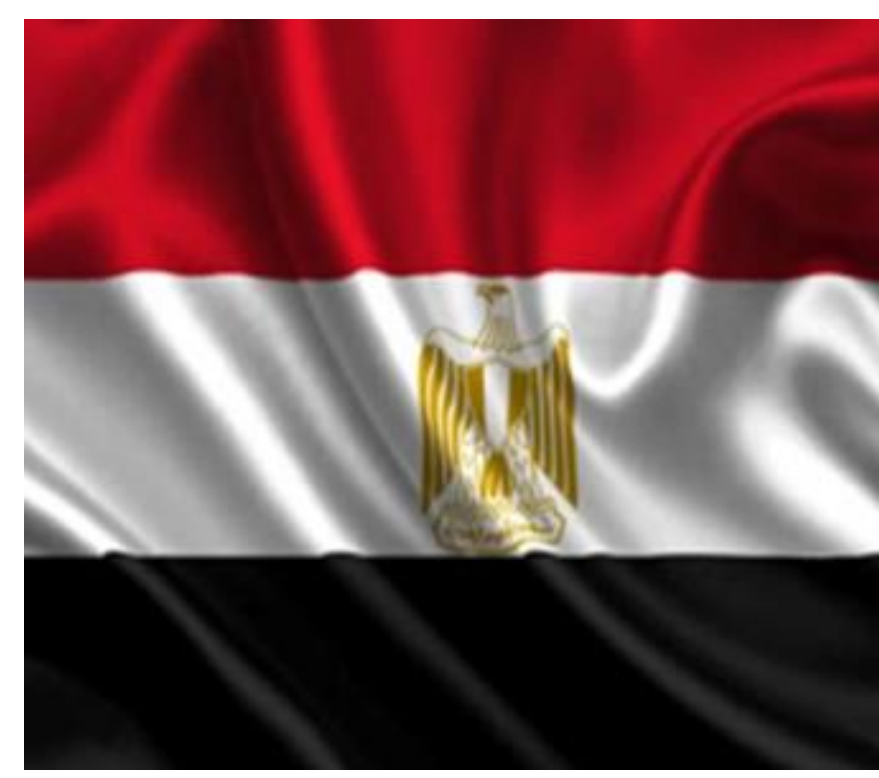




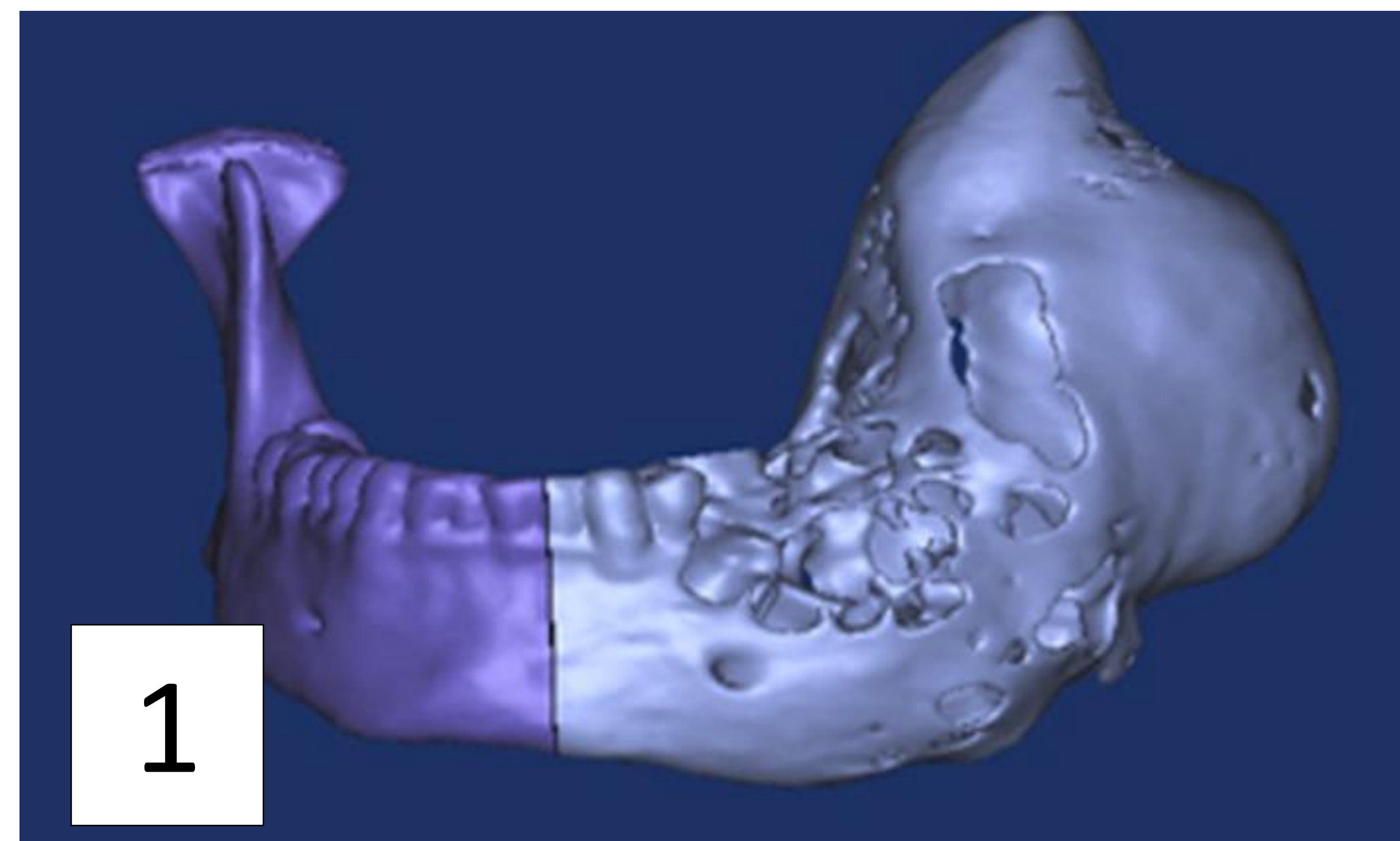
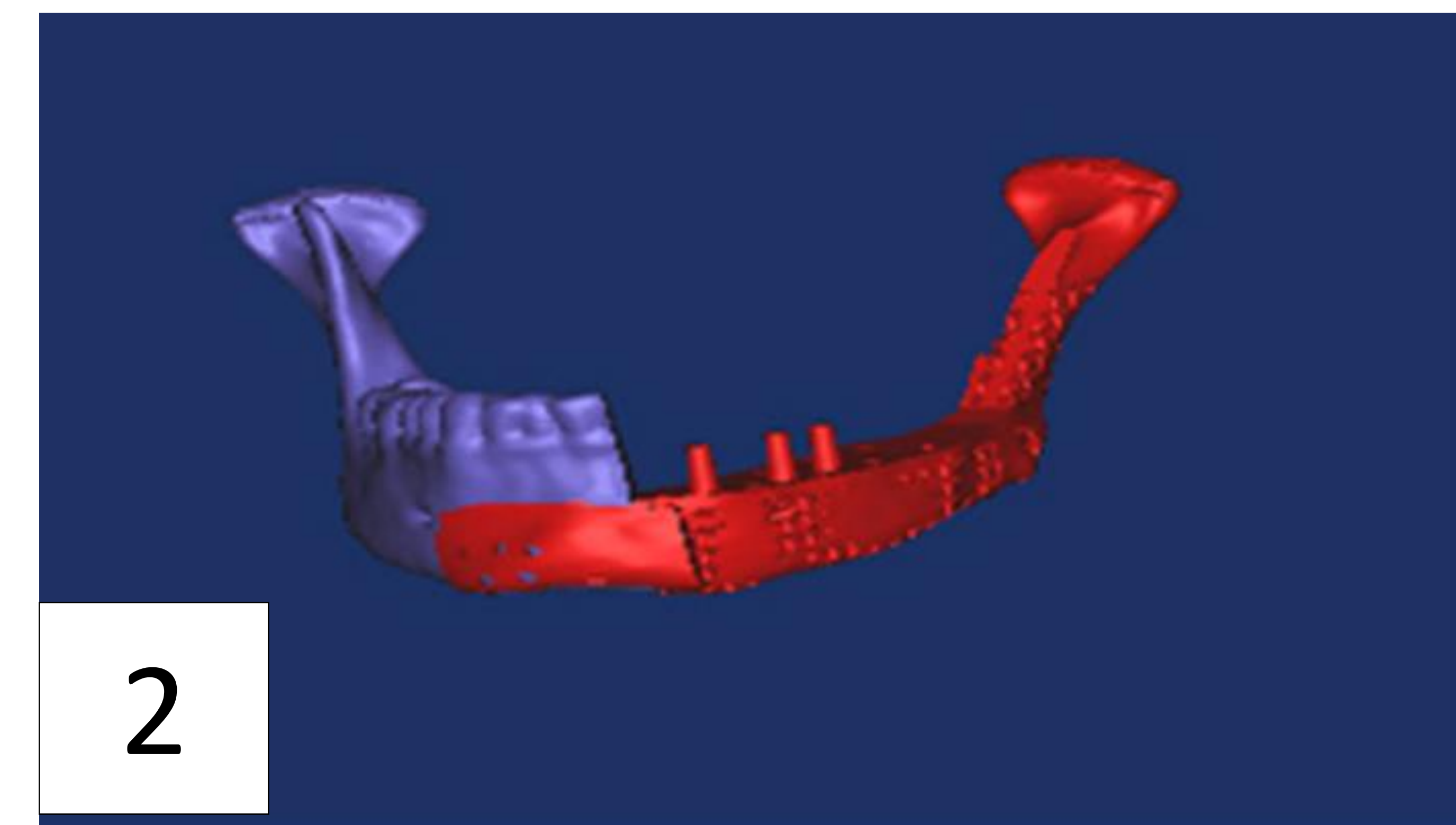
Clinical Assessment Of 3D printed Vs Milled Patient Specific Titanium Implants (PSIs) For Reconstruction Of Mandibular Segmental Defects



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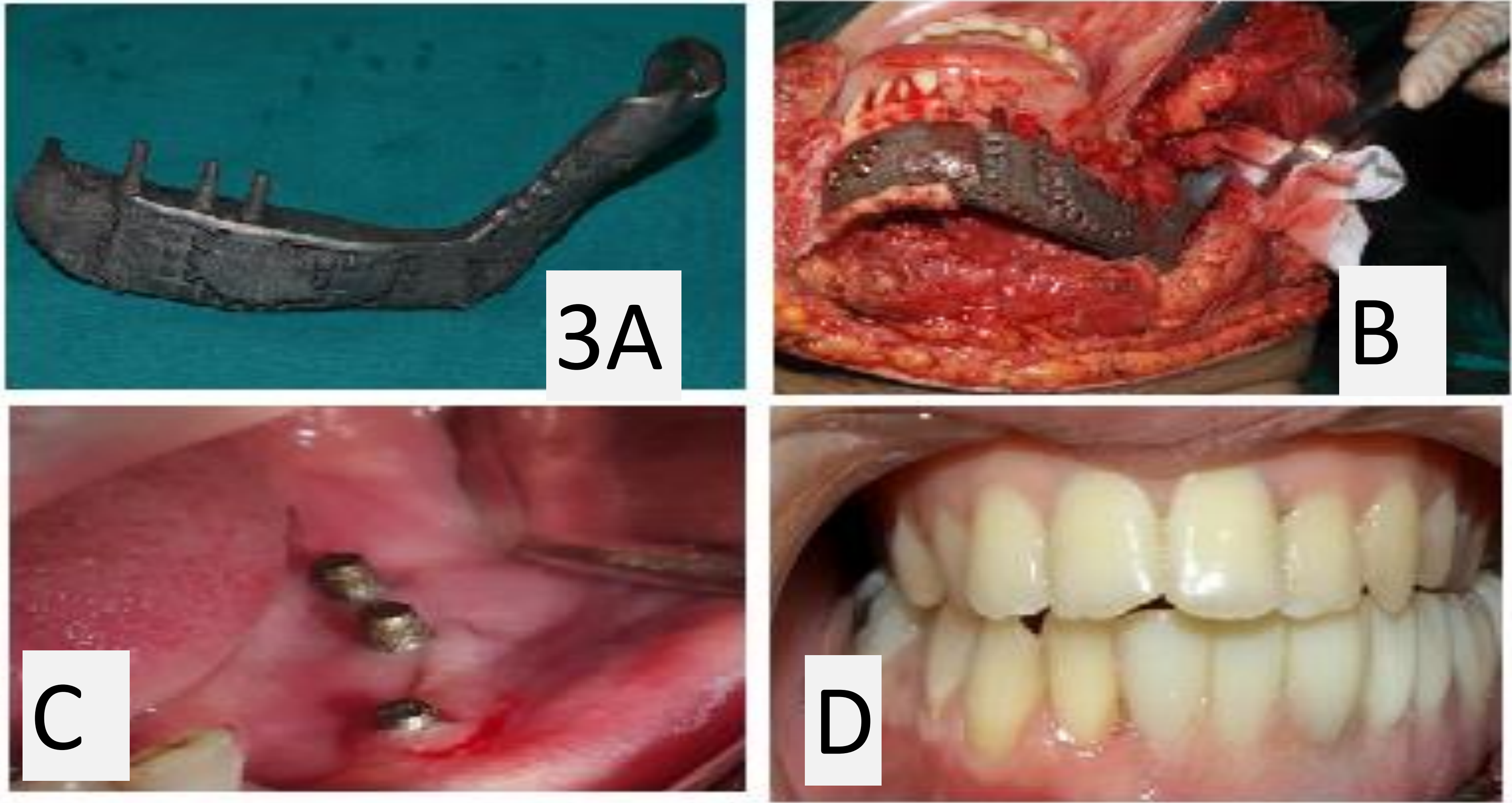
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Introduction: Reconstruction of mandibular discontinuity defects remains a challenge for maxillofacial surgeons. Despite vascularized free flaps representing the current gold standard for managing such defects, the search continues for other less morbid yet predictable interventions. This study aimed at reviving the idea of alloplastic mandibular endoprosthesis as a treatment modality for reconstruction of segmental mandibular defects following eradication of benign tumors. To reconstruct their segmental mandibular defects,

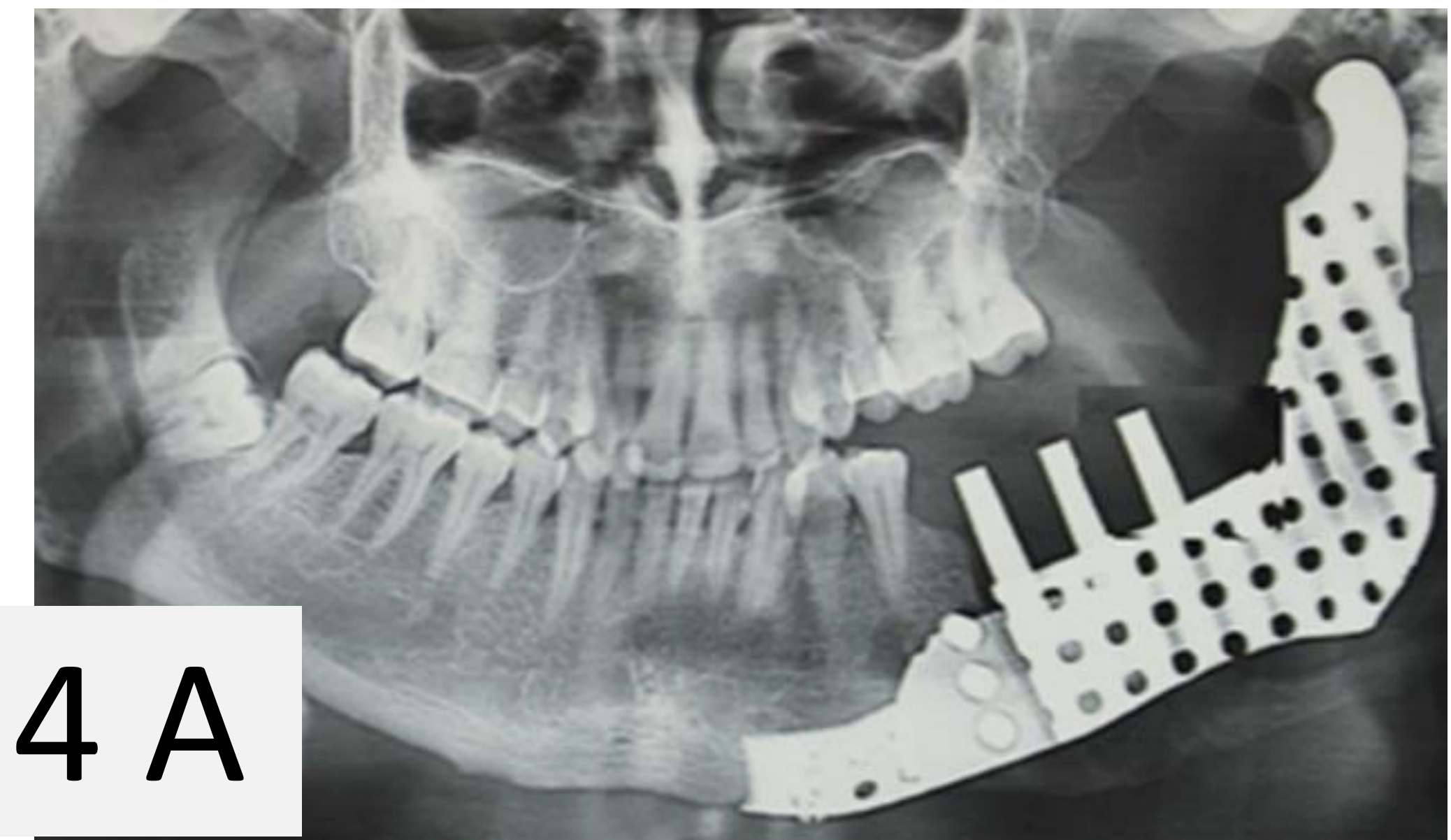
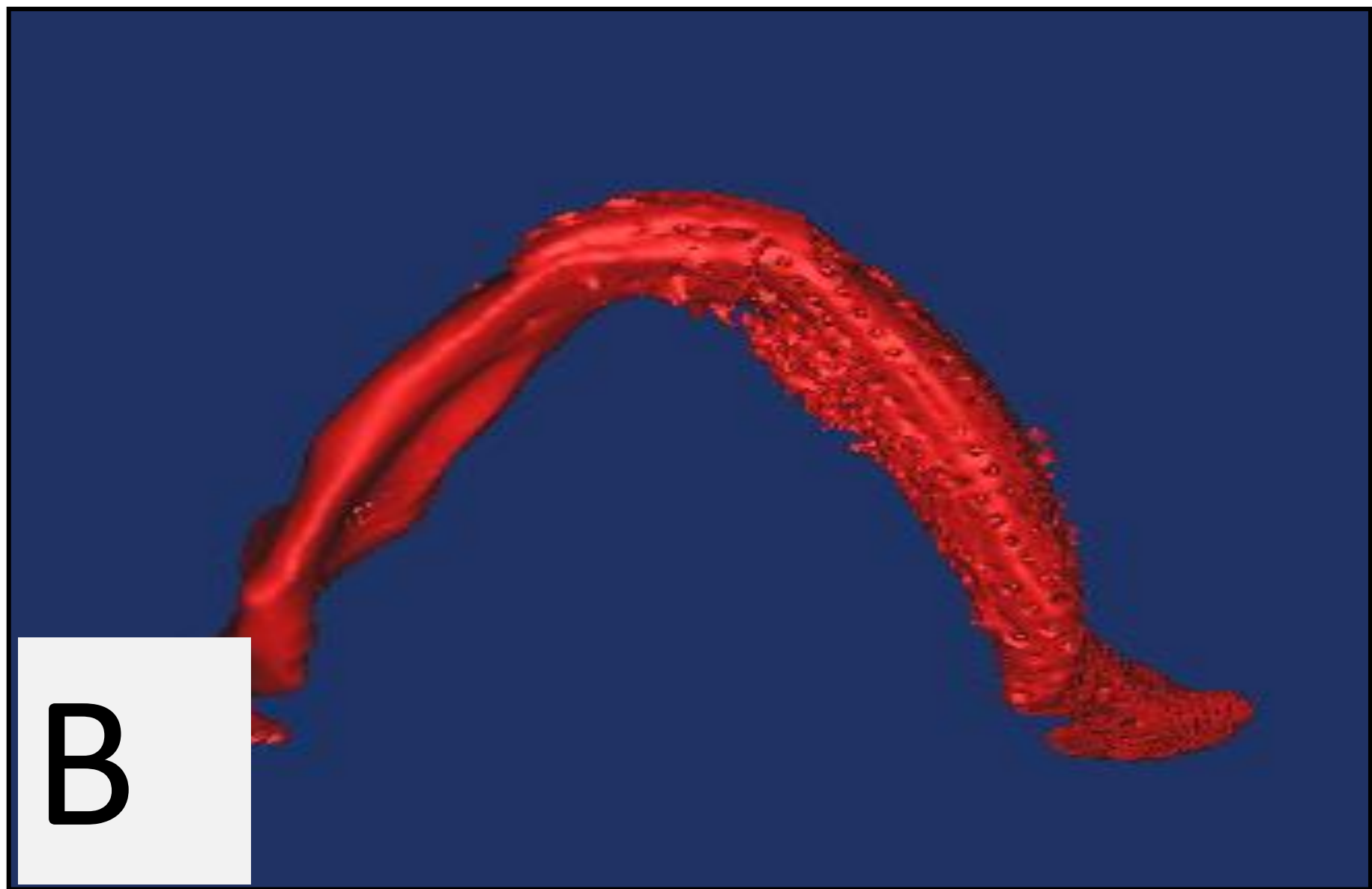


Figures 1,2: 3D Preoperative virtual resection and reconstruction with Patient specific Implant

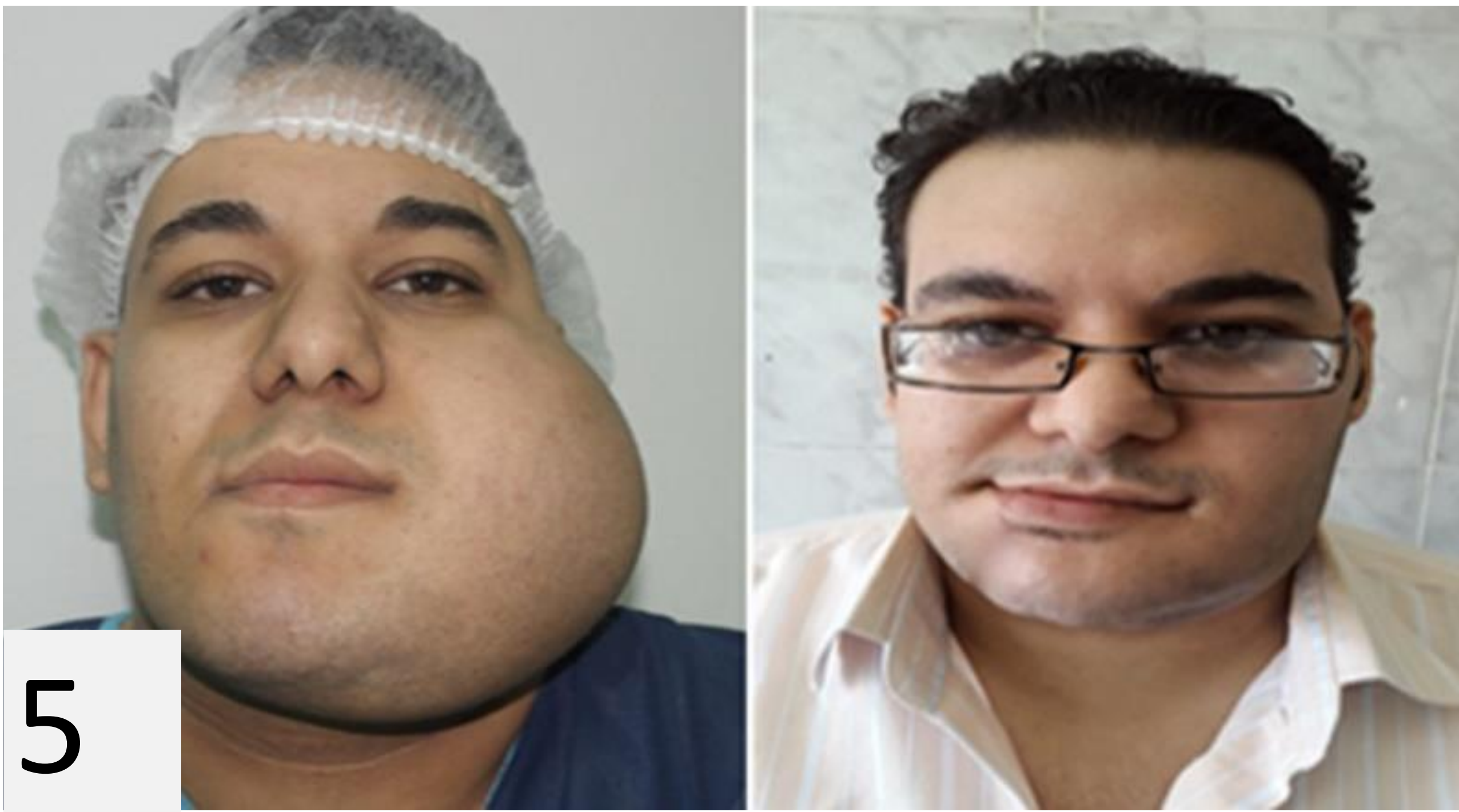
Methods: This Randomized Clinical Trial compiled eight patients who were divided into two equal groups 4 of them received Milled patient-specific titanium implant (PSI) while the other four patients received four 3D printed devices and were designed to receive a fixed cemented restoration for dental rehabilitation.



Case 1 3D printed group: Fig 3 :(A,B) 3D printed titanium patient specific implant in place fixed using bicortical screws. (C,D)6 months postop. Healing and fixed cemented acrylic prosthesis



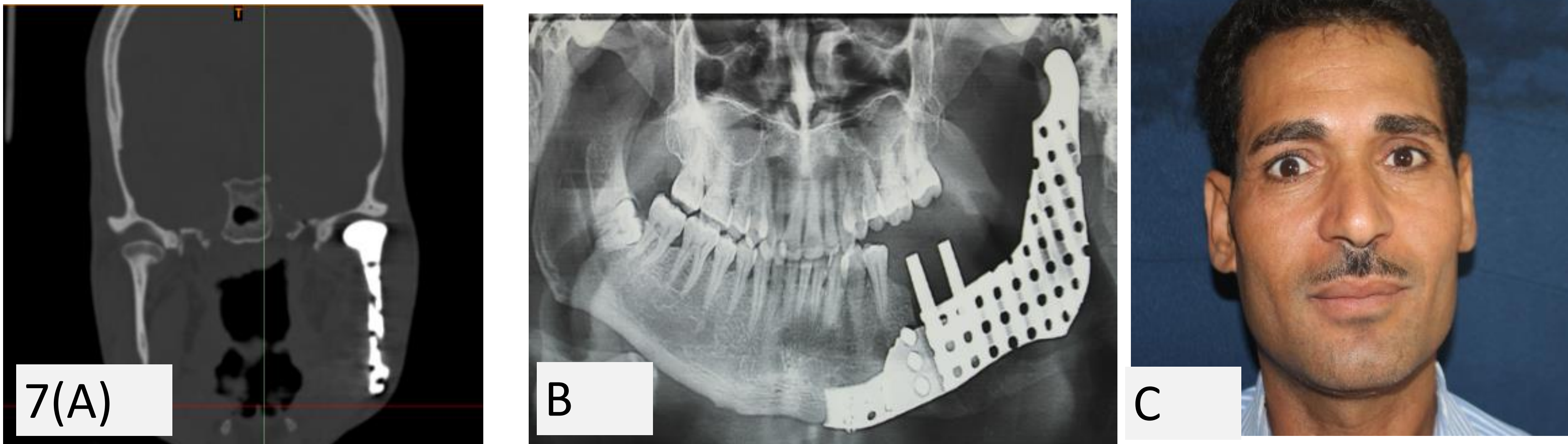
Case 1: Fig 4 (A,B) postoperative panoramic x ray and 3D CT scan showing restoration of facial symmetry



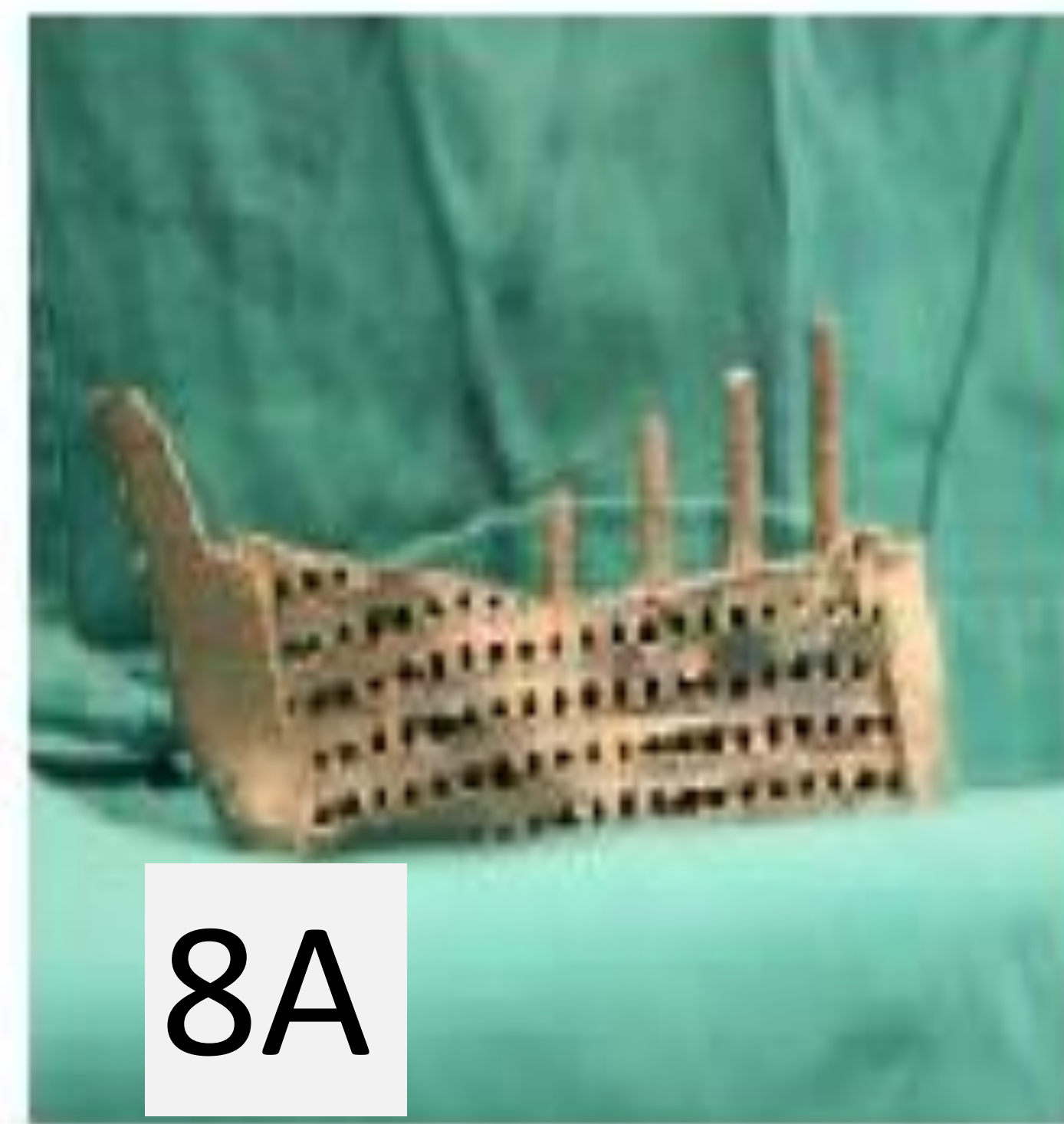
Case 1: Fig 5: restoration of facial contour and symmetry



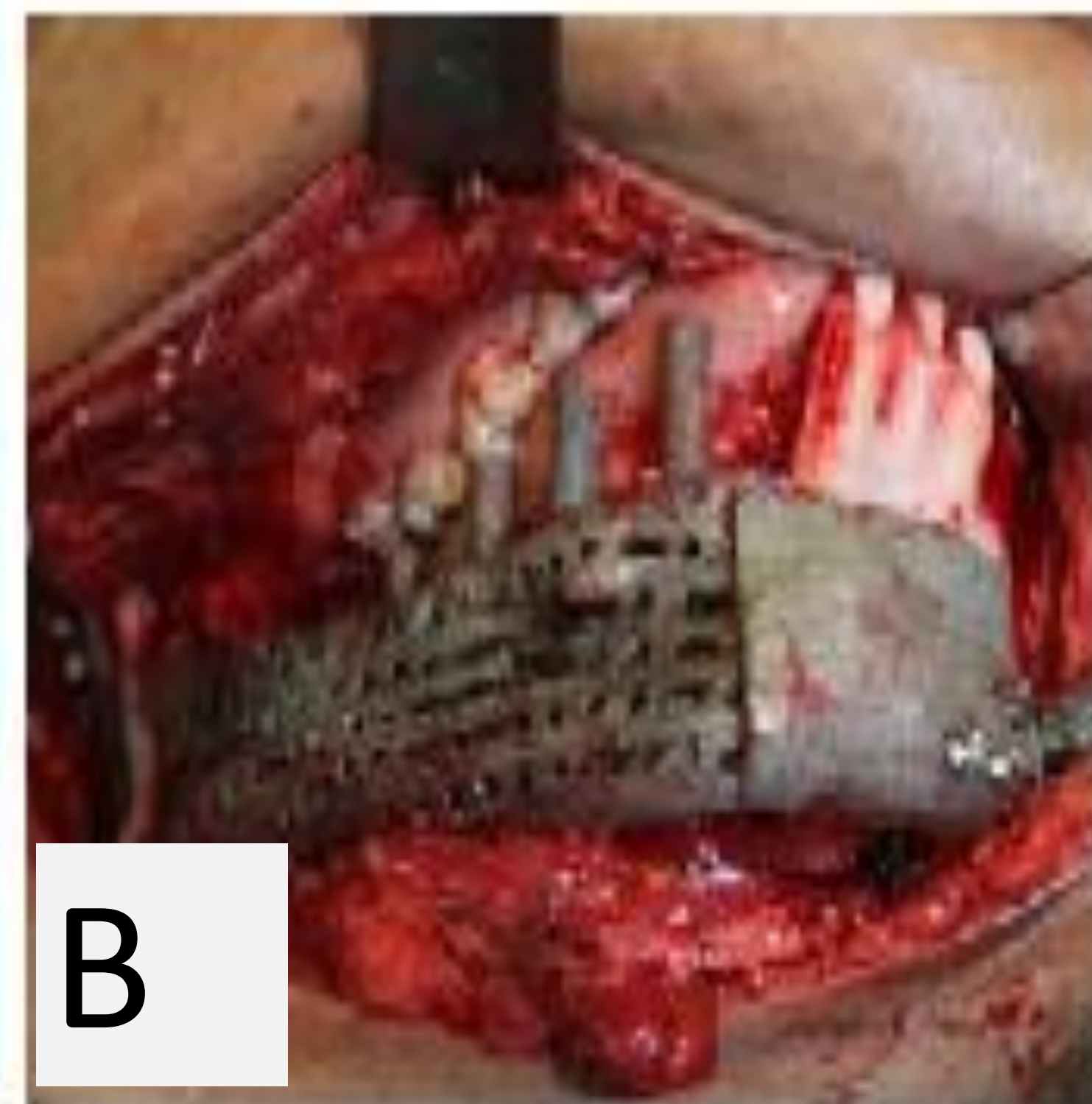
Case 2 3D printed group: Fig 6 :(A,B) 3D printed titanium patient specific implant in place .(C) Healing around single piece abutments



Case 2: Fig 7 (A,B,c) postoperative x ray s and CT scan showing restoration of facial symmetry



8A



B



C



D



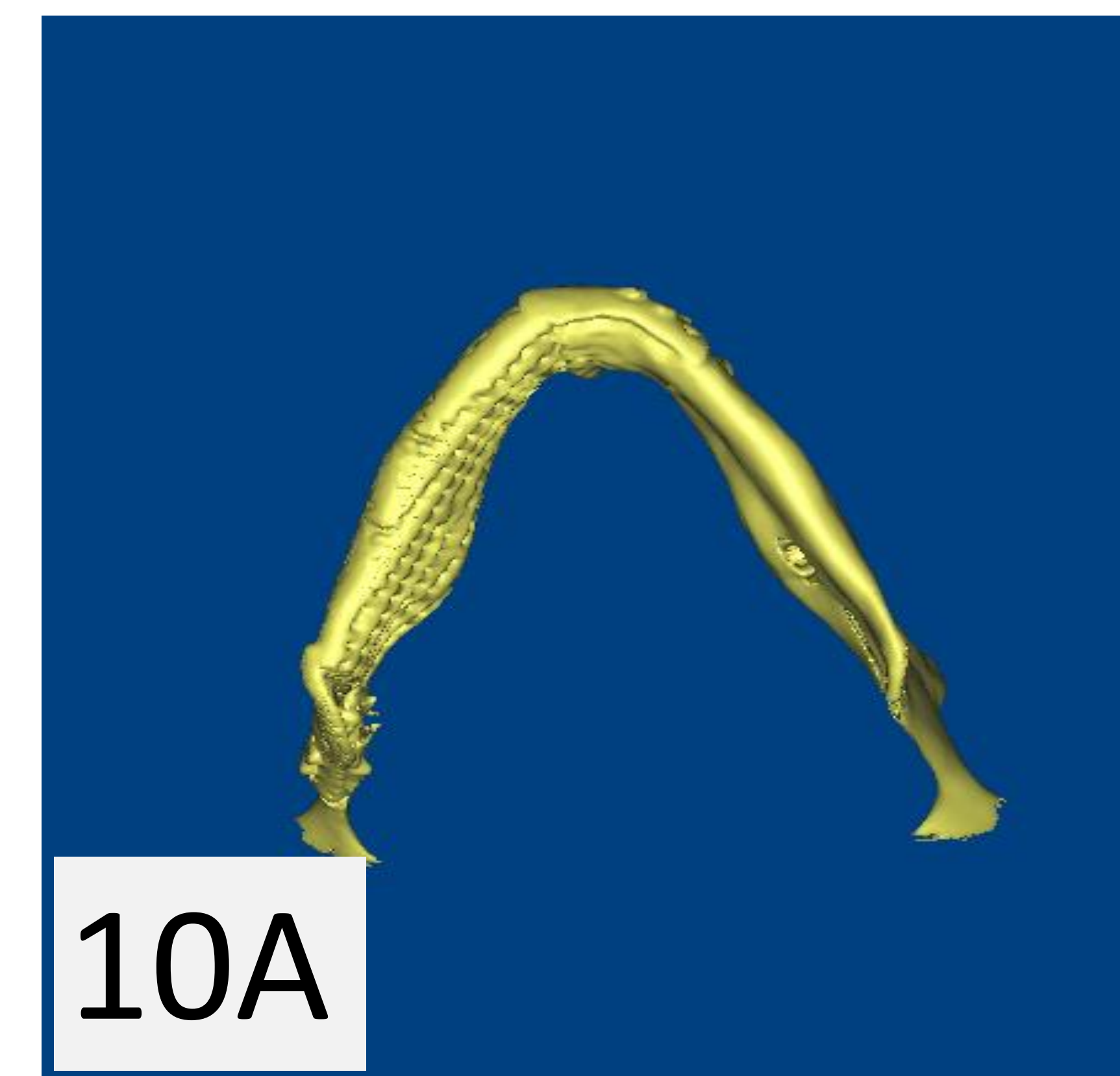
E

Case 3: 3D printed group: Fig 8 :(A,B) 3D printed titanium patient specific implant in place fixed using bicortical screws. (C,D,E)6 months postop. Healing and fixed cemented acrylic prosthesis

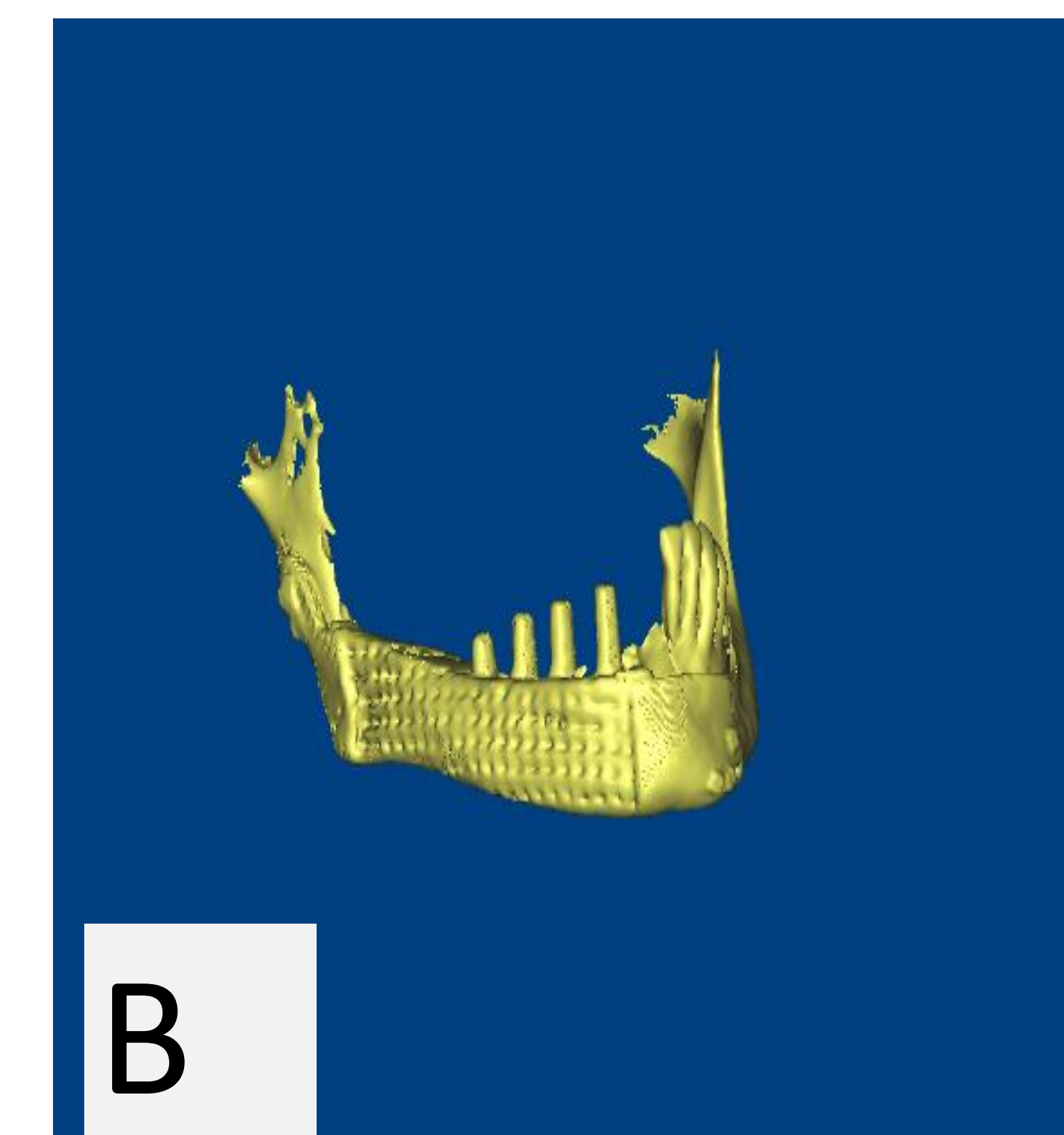


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Case 3: Fig 9 :(A)postoperative panoramic x ray showing restoration of mandibular symmetry

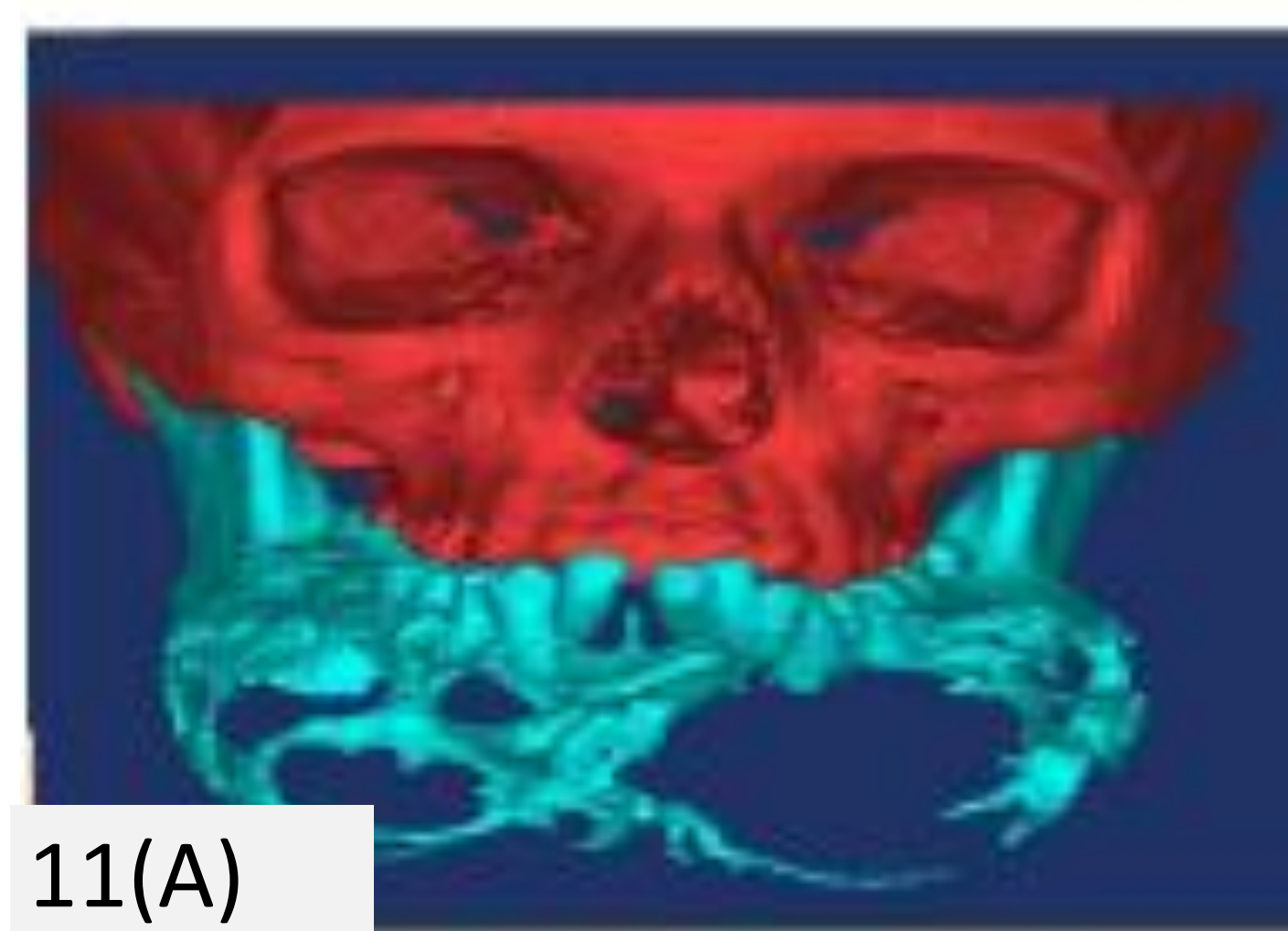


10A

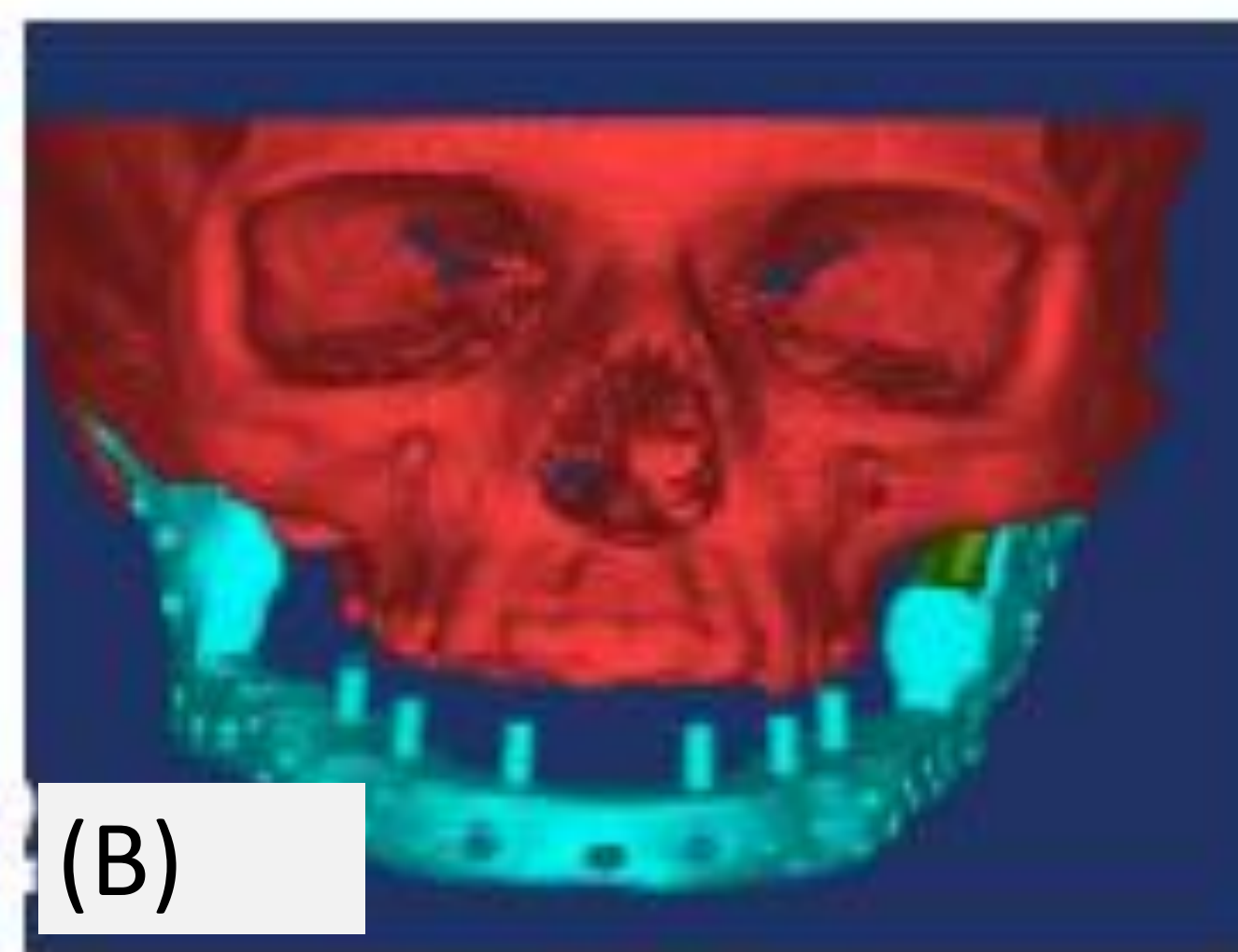


B

Case 3: Fig 10 :(A)postoperative 3D View of C.T scan showing restoration of mandibular symmetry (B)(bottom and lateral views)



11(A)



(B)

Case 4: 3D printed group: Fig 11 :(A,B) preoperative 3D virtual design of the PSI



12(A)



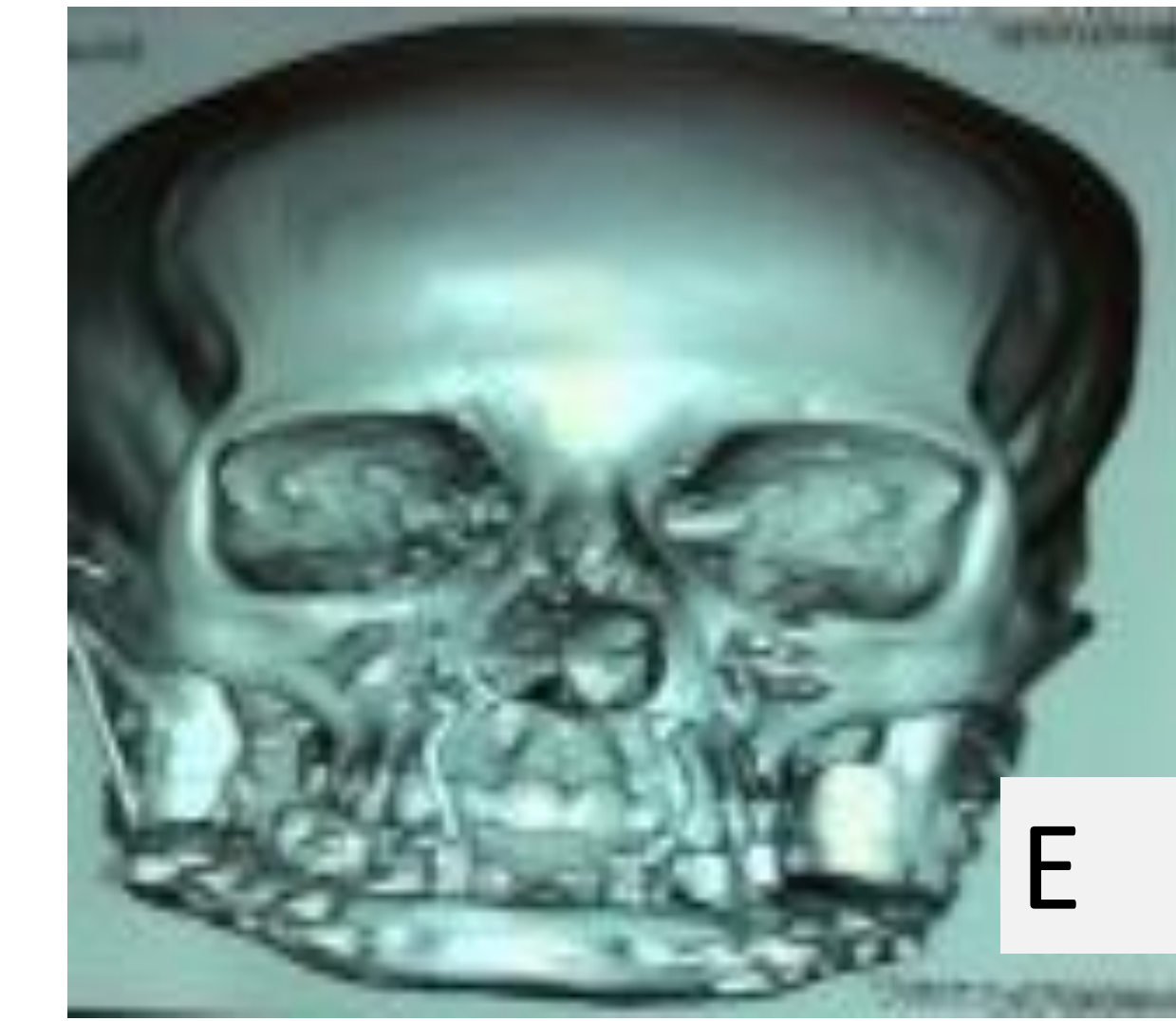
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D

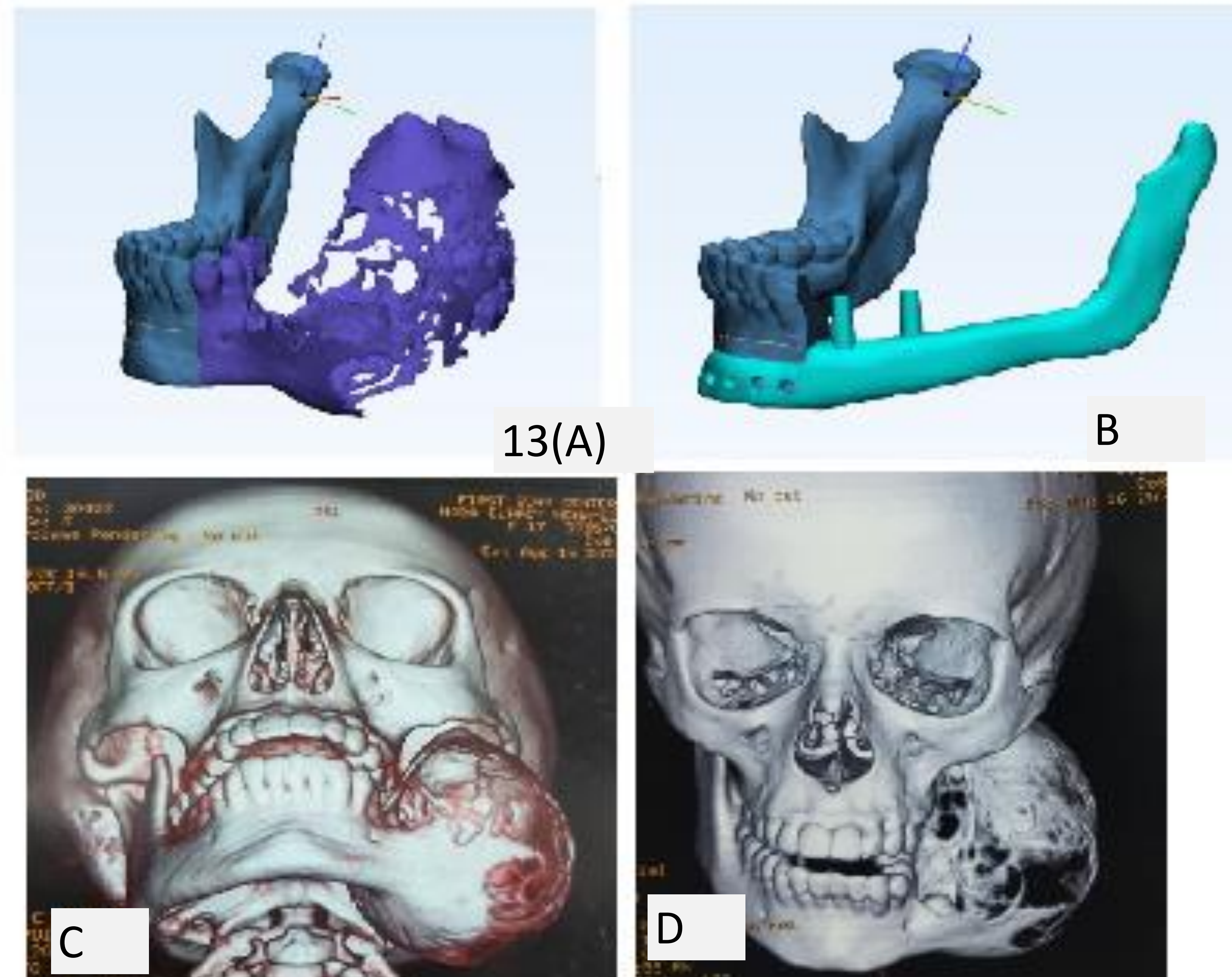


E

Case 4: 3D printed group: Fig 12 :(A,B) 3D printed titanium patient specific implant in place fixed using bicortical screws. (C,D,E)6 months postop. Photos and CT scans Showing restoration of facial contours.

Results: The recruited patients population were followed-up for a period of 3–5 years. Three of the 3D printed group of the 8 PSIs failed due to extensive intraoral mucosal dehiscence or persistent extraoral fistulae. While all patients with the milled , glazed implants enjoyed good results in terms of occlusion,soft tissue coverage, masticatory function, mouth opening as well as pleasing facial esthetics.

Conclusion:The described Milling technique represents a viable less morbid alternative to the standard 3D printed techniques for mandibular reconstruction in carefully selected patients. Further studies are needed to modify the PSI design and surface treatment for better outcomes.



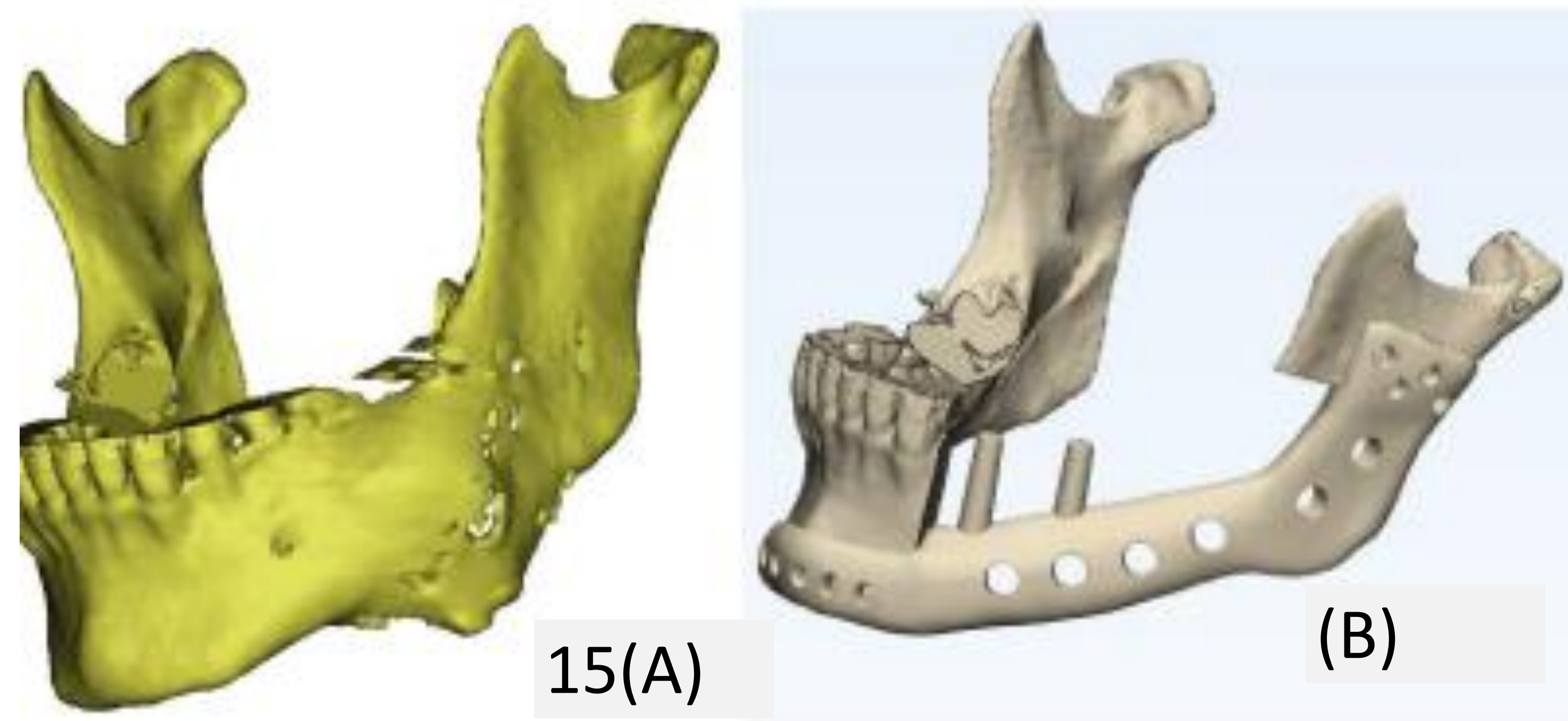
Case 1: 3D Milling group: Fig 13 :(A,B) preoperative 3D virtual design of the PSI (C,D); Preop. 3D views of the lesion



Case 1: Fig 14 :(A,B): 3D milled patient specific titanium implant in place.



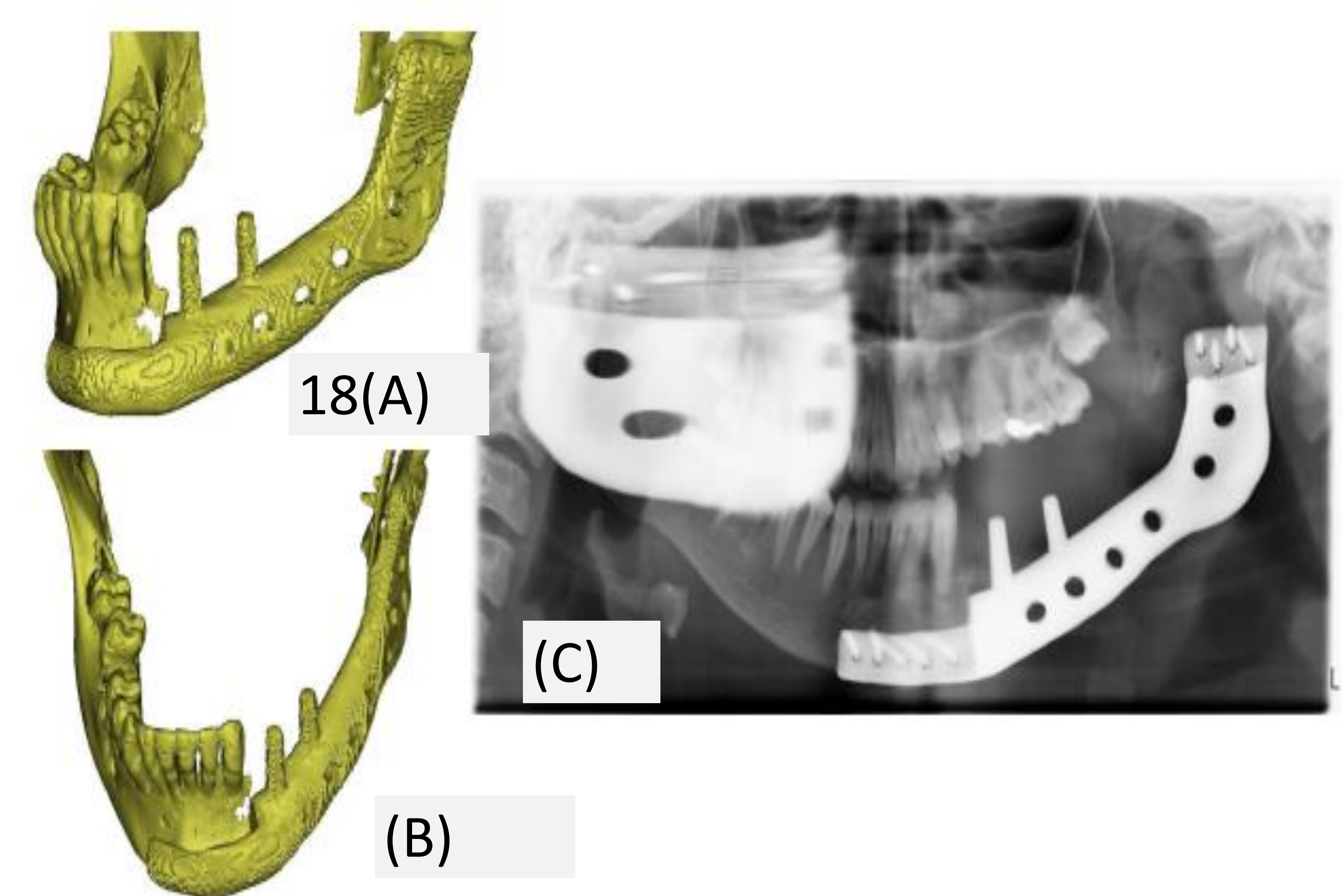
Case 1: Fig 15 :(A,B) postoperative photos(C) panoramic x ray showing restoration of mandibular symmetry



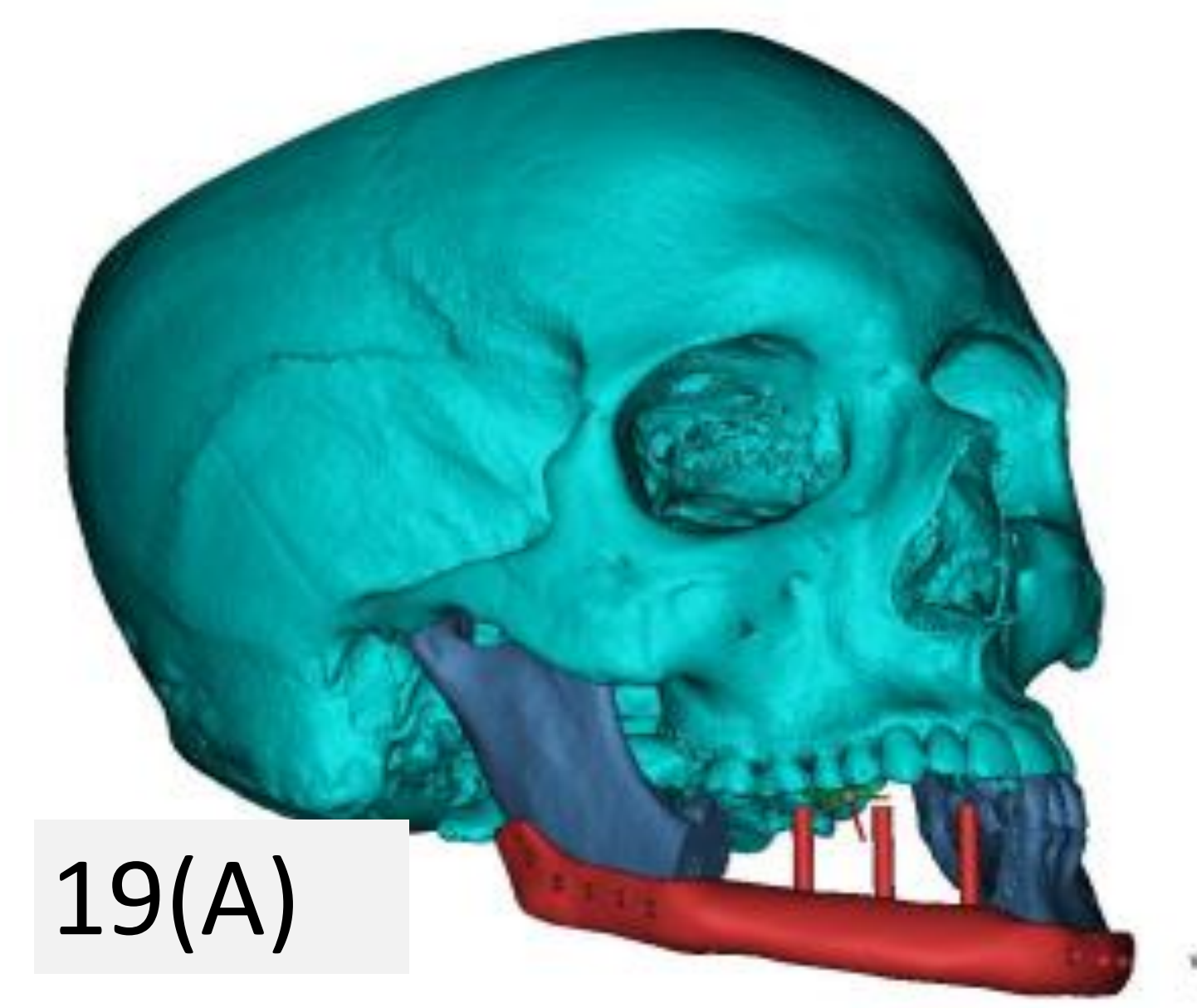
Case 2: 3D Milling group: Fig 16 :(A) Preop. 3D views of the lesion (B) preoperative virtual device of the PSI with single piece abutments



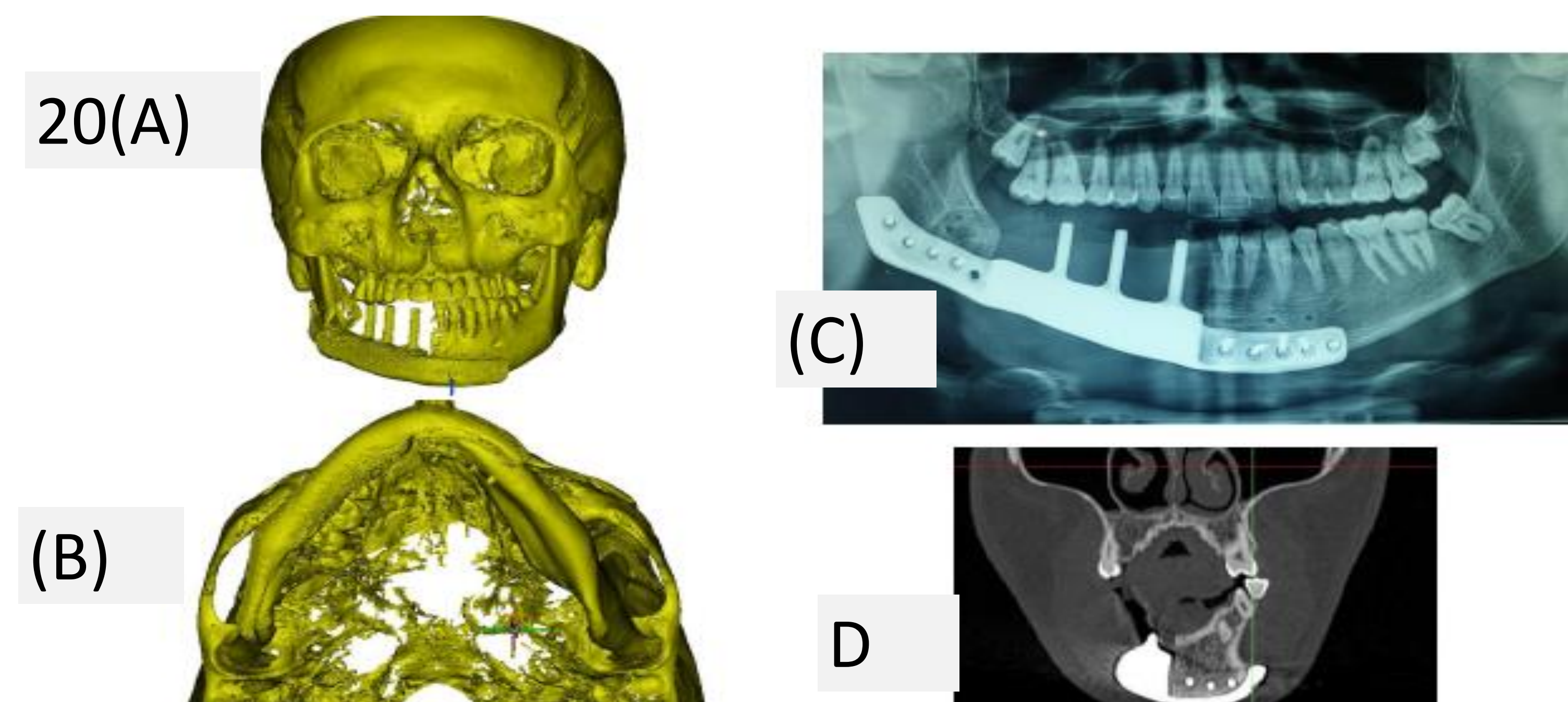
Case 2: Fig 17 :(A,B): 3D milled patient specific titanium implant in place.



Case 2: Fig 18 (A,B,C) :postoperative 3D View of C.T scan and panoramic x rays showing restoration of mandibular symmetry (bottom and lateral views)



Case 3: 3D Milling group: Fig 19 (A) preoperative 3D virtual design of the PSI, (B)PSI in place



Case 3 Fig 20 :postoperative 3D View of C.T scan and panoramic x rays showing restoration of mandibular symmetry (bottom and lateral views)(C,D)postop. C.T scan and panoramic xray



Case 3: Fig 21 :Healing around single piece abutments.