

Supplementary Table S1. TIDieR Checklist for the Custom 3D Surgical Guide Intervention

Item No.	TIDieR Item	Description
1	Brief name	Custom 3D-printed surgical cutting guide–assisted mandibular sagittal split osteotomy (BSSO).
2	Why (rationale, theory, goal)	The intervention was designed to improve osteotomy accuracy and control of split patterns during BSSO by translating virtual surgical planning into precise intraoperative guidance, thereby reducing unfavorable splits and variability inherent to freehand techniques.
3	What (materials)	Patient-specific 3D-printed acrylic surgical cutting guides, derived from cone-beam CT (CBCT) or multislice CT data, along with virtual surgical planning software (3D Slicer, Meshmixer, Blender).
4	What (procedures)	Preoperative CT data were segmented to create a 3D mandibular model. Osteotomy lines were virtually planned following the Obwegeser–Dal Pont–Hunsuck–Epker modification. A custom surgical guide was designed and fabricated using 3D printing. During surgery, the guide was intraorally positioned and secured with miniscrews to guide medial and lateral osteotomies.
5	Who provided	All procedures were performed by board-certified Oral and Maxillofacial Surgeons with experience in orthognathic surgery, supported by radiologists and biomedical engineers trained in virtual surgical planning and CAD/CAM workflows.
6	How (mode of delivery)	Face-to-face surgical intervention performed intraoperatively under general anesthesia, applied individually to each mandibular side according to split-mouth randomization.
7	Where	Operating theatres at Universitas Indonesia Hospital (RSUI) and Universiti Malaya Medical Centre (PPUM), equipped with standard orthognathic surgical and digital planning infrastructure.
8	When and how much	The intervention was delivered once per mandibular side during a single orthognathic surgery session. Guide-assisted osteotomy was performed during the sagittal split phase only.
9	Tailoring	The surgical guide was individualized for each patient based on mandibular anatomy, osteotomy trajectory, and anatomical landmarks, derived from preoperative imaging.
10	Modifications	No modifications to the intervention protocol were made during the course of the study.
11	How well (planned)	Intervention fidelity was ensured by adherence to a standardized digital planning and guide fabrication protocol. Proper guide fit and stability were verified intraoperatively before osteotomy.
12	How well (actual)	All surgical guides were successfully positioned and used as planned, with no intraoperative guide fractures or failures reported.