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광범위 상악 결손의 재건을 위한
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천공지 피판

Multi-Planar Scapular Bone and Chimeric
TDAP Flap for Extensive Maxillary Defects



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Purpose: Reconstructing extensive maxillary defects is challenging due to the need for facial projection, structural support, and oro-nasal separation. This study evaluates a novel chimeric free flap integrating vertical (anterior wall) and horizontal (palate) scapular bone segments with a thoracodorsal artery perforator (TDAP) flap for medial wall resurfacing.

Methods: A retrospective review was performed on 15 patients (9 males, 6 females; mean age 54.7 years) who underwent reconstruction for extensive maxillary defects (Brown scale IIb to V) between 2025 and 2026. To restore the complex 3D geometry, the scapular bone was divided into multiple segments via osteotomy to simultaneously reconstruct the vertical and horizontal planes. TDAP flap was utilized to reconstruct the nasal cavity lining and obliterate dead space. Virtual surgical planning and anatomical measurements were conducted using Mimics and 3-matic software.

Results: Primary diagnoses included squamous cell carcinoma (n=8), adenoid cystic carcinoma (n=3), and osteosarcoma (n=2). Overall flap survival was 100% (15/15). Minor complications were managed conservatively, including one case of partial muscle necrosis, one palatal fistula, and one wound dehiscence. The multi-planar approach successfully restored facial contour and palatal integrity. Patients demonstrated

favorable functional outcomes in speech and swallowing, with minimal donor-site morbidity at the shoulder.

Conclusion: Integrating independent vertical and horizontal scapular bone segments with a chimeric TDAP flap is a highly effective and versatile strategy for extensive maxillary defects. This multi-planar approach provides superior anatomical fidelity, functional recovery, and aesthetic restoration.



Fig 1. Intraoperative photograph of the harvested chimeric multi-planar scapular free flap. The flap incorporates independently vascularized components based on a single subscapular system: osteotomized scapular bone segments tailored for vertical (anterior wall) and horizontal (palate) reconstruction, alongside a soft tissue component (TDAP and LD flap) designed to resurface the medial wall and nasal lining.

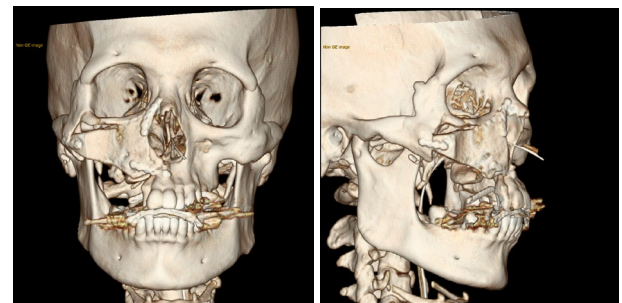


Fig 2. Postoperative 3D computed tomography (CT) reconstructions demonstrating the precise anatomical restoration of the extensive maxillary defect. (A) Frontal view illustrating the reconstructed anterior wall (vertical plane) with rigid fixation. (B) Oblique view demonstrating both the midface projection and the horizontal palatal contour.