

EP-148

**다면체 매트릭스 구성(PMC) 기법:
무세포 동종진피(ADM) 외피의
기하학적 표준화와 유방 전층
재건술 시 수술 효율성에 관한
후향적 코호트 연구**

(The Polyhedral Matrix Configuration (PMC) Technique: A Retrospective Cohort Study of Geometric Standardization of Acellular Dermal Matrix Wrapping and Operative Efficiency in Prepectoral Breast Reconstruction)



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Purpose: Prepectoral breast reconstruction with acellular dermal matrix (ADM) typically requires intraoperative manual tailoring, introducing structural variability and workflow delays. We developed the Polyhedral Matrix Configuration (PMC) technique—a geometric method for standardizing ADM shell creation—and compared it to our traditional "tear-drop" wrap to determine whether standardization improves structural integrity and operative efficiency.

Methods: We reviewed 227 consecutive patients undergoing immediate prepectoral reconstruction from January 2021 to December 2024 (tear-drop group: n=155; PMC group: n=72). PMC transforms planar ADM into a 3D dome using pre-designed wedge resections and butt-joint sutures, eliminating material overlap (Figure 1 and 2). Standardization permits back-table fabrication during mastectomy ("parallel two-team workflow", Figure 3). Bilateral cases were excluded, and subgroup analysis controlled for higher robotic mastectomy rates in the PMC cohort.

Results: PMC reduced plastic surgery time by 44.6 minutes (95% CI: 35.2–54.0, $p < 0.001$), with efficiency gains across both conventional (32.8 min, $p < 0.001$) and robotic mastectomies (60.8 min, $p < 0.001$). Despite zero-overlap design, PMC showed no increase in major complications ($p > 0.99$) and lower visible rippling rates (OR 0.28, 95% CI: 0.08–0.97, $p = 0.032$). BREAST-Q "Satisfaction with Breasts" scores were higher in PMC group (mean difference +7.3 points, 95% CI: 3.1–11.5, $p = 0.001$). Clinical outcomes demonstrated maintained projection and smooth contours (Figure 4).

Conclusion: Geometric standardization enables both design precision and operative efficiency. By separating reconstruction preparation from mastectomy through a reproducible protocol, PMC reduces operative time while improving aesthetics through stable, single-layer construction.

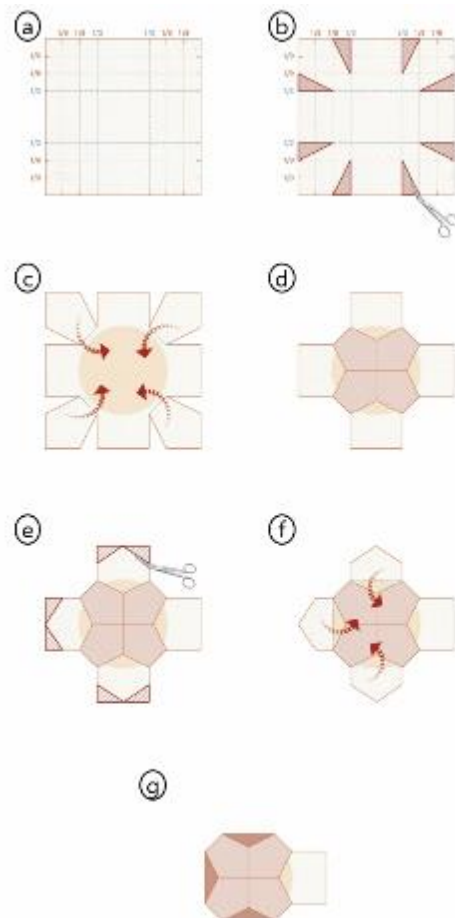


Fig 1. PMC technique assembly protocol. (a) Template marking with 9 × 9 grid. (b) Wedge resection of triangular sections at 1:2 base-to-height ratio. (c) Corner flaps fold to form octagonal base. (d) Butt-joint sutures create zero-overlap alignment. (e) Peripheral trimming shapes sidewall contours. (f) Completed

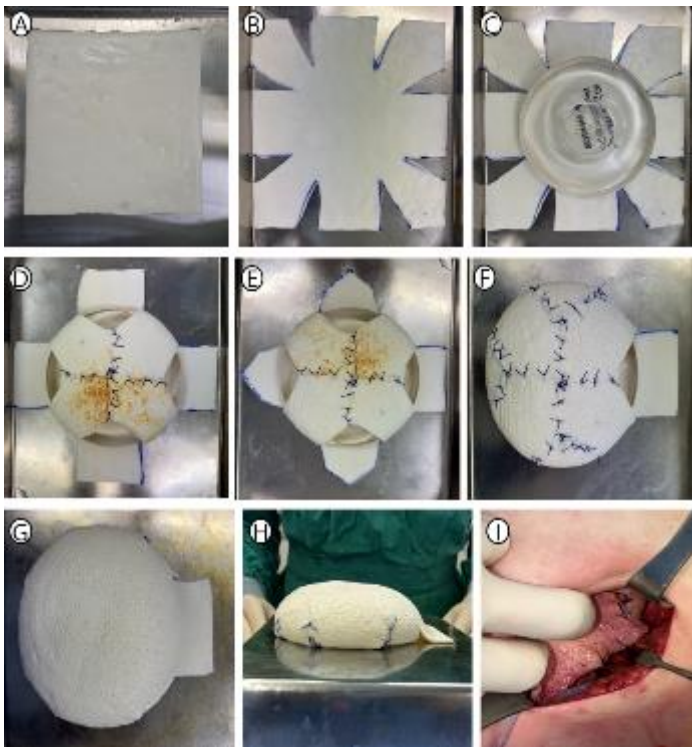


Fig 2. PMC shell assembly during surgery. (A) ADM sheet secured to sterile sizer on back table. (B–E) Sequential wedge resection and butt-joint suturing create 3D volume. (F,G) Completed dome-shaped PMC module ready for insertion. (H) Final view after implant insertion. The zerooverlap construct creates a smooth interface with overlying tissue. (I) The window's edge anchors to pectoralis major fascia.

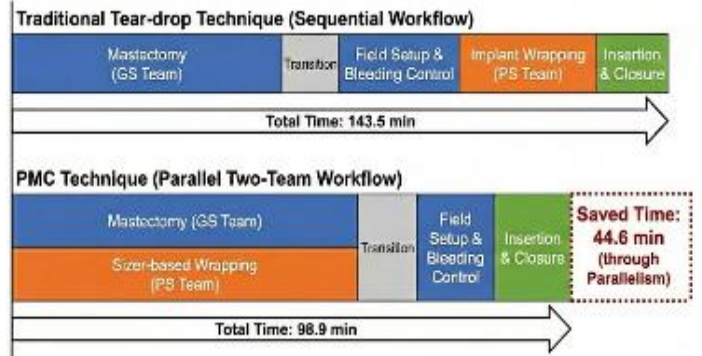


Fig 3. Operative workflow comparison. (Top): Traditional tear-drop technique—reconstruction starts after mastectomy completion. (Bottom): PMC technique—plastic surgery team fabricates ADM shell on back table during mastectomy. Red dashed box indicates mean time saved (44.6 min) through parallel processing.

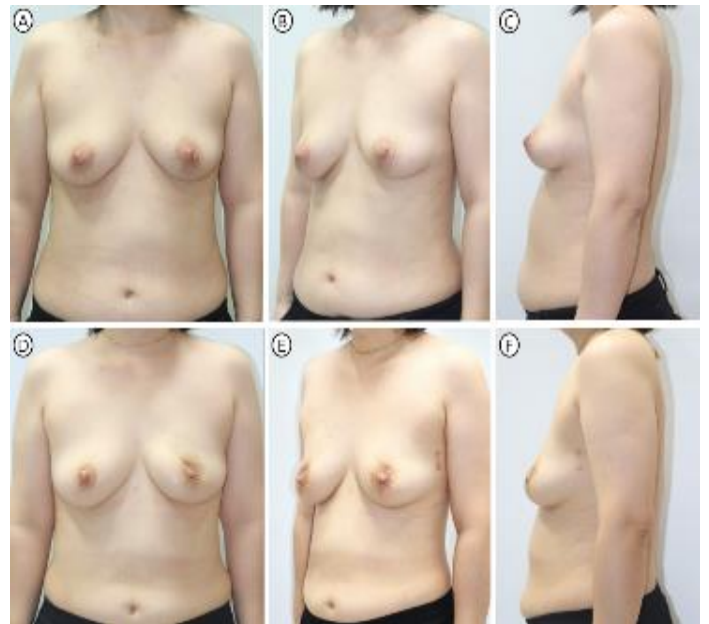


Fig 4. Representative case—preoperative and 6-month postoperative views. A 40-year-old patient (BMI 24.8 kg/m²) underwent immediate prepectoral reconstruction following left robotic nipple-sparing mastectomy. Reconstruction used a 235 cc Mentor smooth round implant wrapped in 18 × 18 cm² Bellacell ADM via lateral vertical incision. (A–C) Preoperative baseline morphology. (D–F) Six-month postoperative results show maintained projection and symmetry with smooth upper pole transition despite thin skin envelope from robotic dissection.