

**EP-060**

**한국인 환자에서 안면부 Keystone  
피판 재건술 후 흉터에 대한 환자  
및 관찰자 평가**

(Patient and Observer Scar Assessment of  
Facial Keystone Flap  
Reconstruction in Korean Patients)



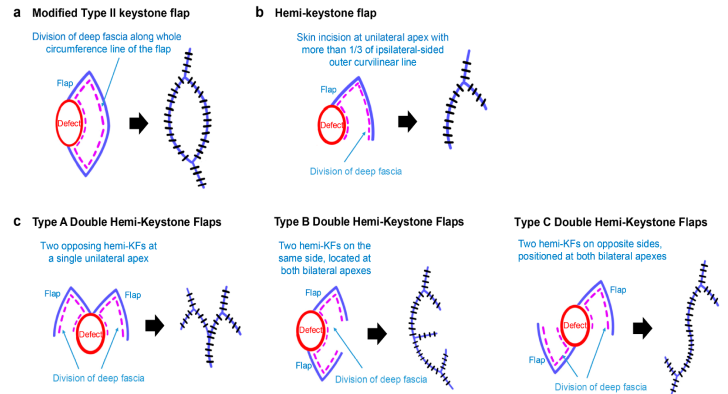
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**Purpose:** Facial reconstruction using keystone flaps (KFs) provides reliable outcomes; however, few studies have evaluated postoperative scarring using patient reported outcomes. We assessed scar outcomes after facial KF reconstruction using the Patient and Observer Scar Assessment Scale (POSAS) and explored associations with clinical and sociodemographic factors.

**Methods:** In this retrospective observational cohort study, 43 Korean patients (27 males, 16 females; mean age: 49.95 ± 20.66 [range, 10–88] years) who underwent facial KF reconstruction between January 2020 and November 2022 were stratified by age (<30, 40s–50s, ≥60 years), KF type (hemi-KF vs. other types), and sex.

**Results:** Patients aged ≤30 years showed significantly higher total Patient Scar Assessment Scale (PSAS) scores (18.53 ± 5.69) than those aged 40s–50s (13.33 ± 3.27) and ≥60 years (11.82 ± 3.28) (p < 0.001). Observer Scar Assessment Scale and patient satisfaction scores did not significantly differ across flap types or sex; however, the hemi-KF group showed a trend toward better outcomes, and female patients reported higher PSAS scores.

**Conclusion:** Facial KF reconstruction yields generally satisfactory scar outcomes. Younger patients are more critical of scars, and female patients exhibit greater aesthetic sensitivity. Patient reported scar assessments are essential for individualized counseling, planning, and scar care in facial reconstruction.



**Figure 1.** Schematic illustrations of the modifications of keystone flap (KF) techniques used in this study. (a) Modified Type II KF technique. (b) Hemi-KF technique. (c) Double hemi-KFs techniques: Type A, Type B, and Type C.

**Table 1.** Comparison of Patient Scar Assessment Scale and Observer Scar Assessment Scale scores among age-stratified groups.

| PSAS                               | Group A (Mean ± SD) | Group B (Mean ± SD) | Group C (Mean ± SD) | p-Value | Post Hoc Analysis |
|------------------------------------|---------------------|---------------------|---------------------|---------|-------------------|
| Pain                               | 2.35 ± 1.169        | 1.40 ± 0.507        | 1.27 ± 0.467        | 0.001   | A > B, C          |
| Itching                            | 2.71 ± 1.312        | 1.47 ± 0.640        | 1.64 ± 0.674        | 0.004   | A > B             |
| Color                              | 3.53 ± 1.663        | 2.67 ± 0.724        | 1.73 ± 0.786        | 0.001   | A, B > C          |
| Stiffness                          | 3.29 ± 1.047        | 2.53 ± 0.743        | 2.18 ± 0.603        | 0.003   | A > B, C          |
| Thickness                          | 3.12 ± 0.993        | 2.60 ± 0.828        | 2.55 ± 0.934        | 0.129   | A > C             |
| Irregularity                       | 3.53 ± 1.068        | 2.67 ± 0.976        | 2.45 ± 0.934        | 0.020   | A > C             |
| Total score                        | 18.53 ± 5.691       | 13.33 ± 3.266       | 11.82 ± 3.281       | 0.001   | A > B, C          |
| Overall patient satisfaction score | 3.76 ± 1.480        | 2.80 ± 0.862        | 2.82 ± 0.874        | 0.074   | NA                |

| OSAS                  | Group A (Mean ± SD) | Group B (Mean ± SD) | Group C (Mean ± SD) | p-Value | Post Hoc Analysis |
|-----------------------|---------------------|---------------------|---------------------|---------|-------------------|
| Vascularity           | 2.50 ± 0.829        | 2.70 ± 1.014        | 2.14 ± 0.234        | 0.339   | NA                |
| Pigmentation          | 2.53 ± 0.819        | 2.87 ± 1.288        | 2.18 ± 0.337        | 0.253   | NA                |
| Thickness             | 3.18 ± 0.749        | 3.37 ± 0.812        | 3.18 ± 1.079        | 0.403   | NA                |
| Pliability            | 2.82 ± 0.749        | 2.93 ± 0.799        | 2.55 ± 0.820        | 0.311   | NA                |
| Relief                | 2.76 ± 0.752        | 2.73 ± 0.799        | 2.55 ± 0.820        | 0.572   | NA                |
| Surface area          | 3.50 ± 0.729        | 3.37 ± 0.855        | 2.82 ± 1.007        | 0.034   | A > C             |
| Total score           | 17.29 ± 3.759       | 17.97 ± 4.011       | 15.41 ± 4.061       | 0.111   | NA                |
| Objective scar rating | 3.56 ± 0.846        | 3.77 ± 0.904        | 3.09 ± 1.221        | 0.063   | NA                |

**Table 2.** Comparison of Patient Scar Assessment Scale and Observer Scar Assessment Scale scores between groups stratified by flap type.

| PSAS                               | Group D (Mean ± SD) | Group E (Mean ± SD) | p-Value |
|------------------------------------|---------------------|---------------------|---------|
| Pain                               | 1.92 ± 1.129        | 1.47 ± 0.514        | 0.186   |
| Itching                            | 2.00 ± 1.233        | 2.00 ± 0.935        | 0.693   |
| Color                              | 2.65 ± 1.198        | 2.94 ± 1.638        | 0.655   |
| Stiffness                          | 2.62 ± 1.061        | 2.94 ± 0.748        | 0.132   |
| Thickness                          | 2.65 ± 1.018        | 3.00 ± 0.791        | 0.088   |
| Irregularity                       | 2.88 ± 1.107        | 3.06 ± 1.088        | 0.517   |
| Total score                        | 14.73 ± 6.004       | 15.41 ± 3.825       | 0.337   |
| Overall patient satisfaction score | 3.08 ± 1.197        | 3.35 ± 1.272        | 0.466   |

| OSAS                  | Group D (Mean ± SD) | Group E (Mean ± SD) | p-Value |
|-----------------------|---------------------|---------------------|---------|
| Vascularity           | 2.48 ± 0.922        | 2.47 ± 0.649        | 0.364   |
| Pigmentation          | 2.58 ± 1.046        | 2.53 ± 0.819        | 0.611   |
| Thickness             | 3.08 ± 0.717        | 3.50 ± 0.984        | 0.176   |
| Pliability            | 2.67 ± 0.706        | 2.97 ± 0.874        | 0.308   |
| Relief                | 2.60 ± 0.788        | 2.85 ± 0.745        | 0.291   |
| Surface area          | 3.13 ± 0.672        | 3.50 ± 1.104        | 0.233   |
| Total score           | 16.54 ± 3.658       | 17.82 ± 4.387       | 0.304   |
| Objective scar rating | 3.42 ± 0.913        | 3.65 ± 1.101        | 0.587   |

**Table 3.** Comparison of Patient Scar Assessment Scale and Observer Scar Assessment Scale scores between groups stratified by sex.

| PSAS                               | Group F (Mean ± SD) | Group G (Mean ± SD) | p-Value |
|------------------------------------|---------------------|---------------------|---------|
| Pain                               | 1.48 ± 0.580        | 2.19 ± 1.276        | 0.472   |
| Itching                            | 1.81 ± 0.962        | 2.31 ± 1.302        | 0.796   |
| Color                              | 2.70 ± 1.463        | 2.88 ± 1.258        | 0.288   |
| Stiffness                          | 2.67 ± 0.832        | 2.88 ± 1.147        | 0.065   |
| Thickness                          | 2.59 ± 0.694        | 3.13 ± 1.204        | 0.052   |
| Irregularity                       | 2.70 ± 0.993        | 3.38 ± 1.147        | 0.245   |
| Total score                        | 13.96 ± 4.109       | 16.75 ± 6.445       | 0.110   |
| Overall patient satisfaction score | 2.93 ± 1.207        | 3.63 ± 1.147        | 0.124   |

| OSAS                  | Group F (Mean ± SD) | Group G (Mean ± SD) | p-Value |
|-----------------------|---------------------|---------------------|---------|
| Vascularity           | 2.59 ± 0.832        | 2.28 ± 0.774        | 0.473   |
| Pigmentation          | 2.76 ± 1.050        | 2.22 ± 0.657        | 0.501   |
| Thickness             | 3.26 ± 0.685        | 3.22 ± 1.095        | 0.179   |
| Pliability            | 2.81 ± 0.709        | 2.75 ± 0.913        | 0.079   |
| Relief                | 2.76 ± 0.698        | 2.59 ± 0.898        | 0.027   |
| Surface area          | 3.03 ± 0.800        | 3.25 ± 1.017        | 0.045   |
| Total score           | 17.48 ± 3.531       | 16.31 ± 4.629       | 0.356   |
| Objective scar rating | 3.52 ± 0.882        | 3.50 ± 1.169        | 0.072   |