

Repigmentation of the Nipple-Areola Complex following Gender-Affirming Mastectomy with Free Nipple Grafting

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Background

- NAC hypopigmentation is a recognized aesthetic outcome after free nipple grafting (FNG) in gender-affirming mastectomy.
- The time course and degree of spontaneous repigmentation remain poorly characterized.**

Aims

To evaluate longitudinal NAC pigmentation changes after FNG, including temporal trends and variation by patient characteristics.

Methods

Study Design: Retrospective cohort study of patients undergoing GAM with FNG.

Population: N=104 patients with standardized preoperative, early (0–6 months), and mid (6–12 months) postoperative photographs; subset with late follow-up (>12 months).

Image Analysis: NAC hypopigmentation quantified using ImageJ by blinded reviewers.

Analysis: Longitudinal changes assessed with paired t-tests. Subgroup comparisons performed by race and pigmentation trajectory.

Cohort Selection

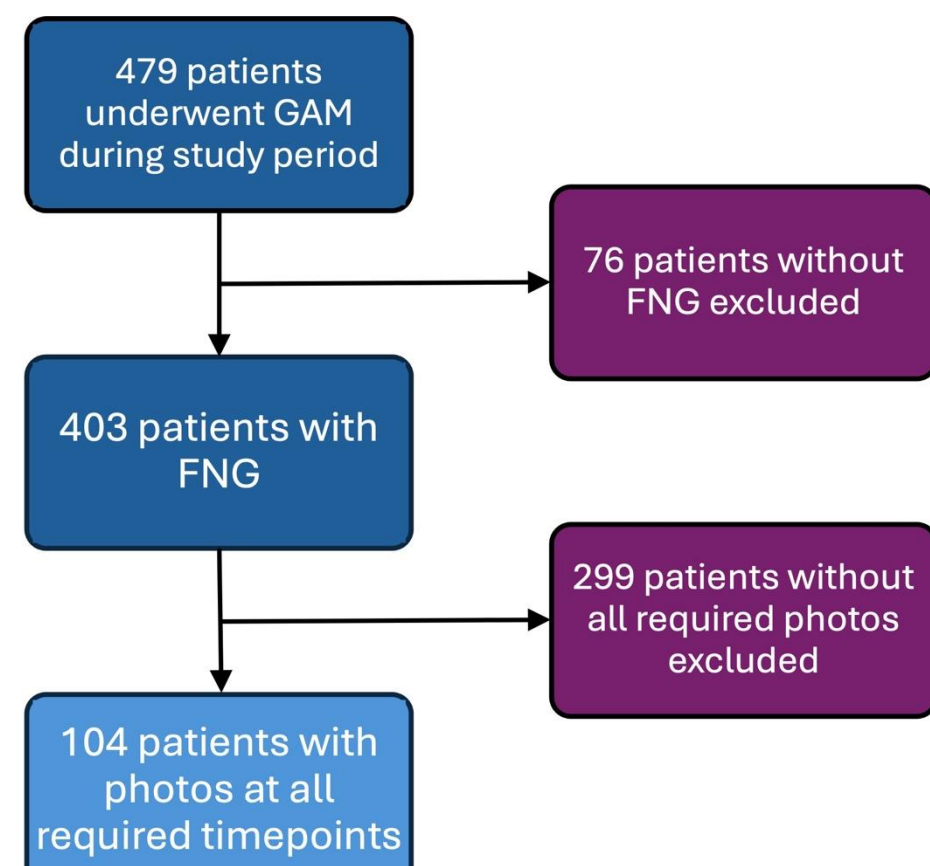
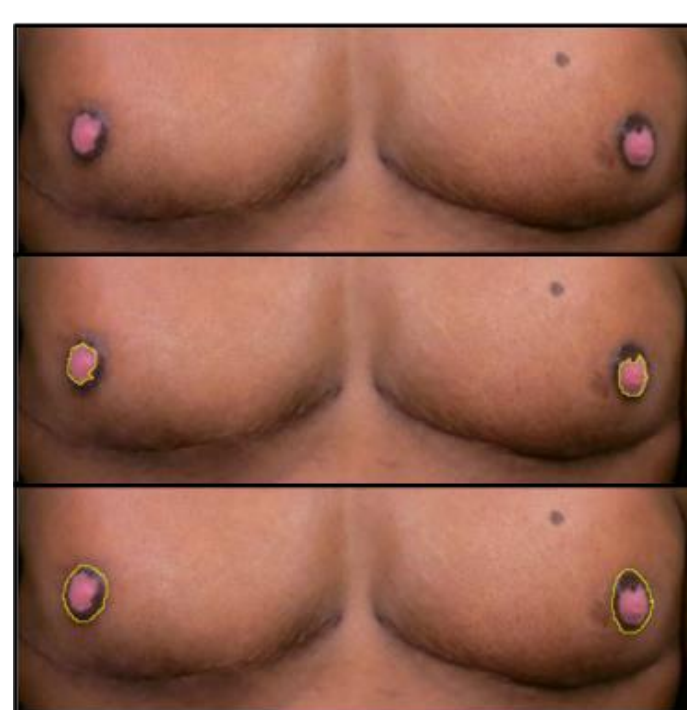


Image Analysis



$$\% \text{ hypopigmentation} = \frac{\text{bilateral hypopigmentation area}}{\text{bilateral NAC area}} * 100$$

Figure 1. Left: Study cohort selection algorithm demonstrating inclusion of patients undergoing gender-affirming mastectomy with FNG and exclusion based on incomplete photographic follow-up. **Right:** Image analysis workflow for quantifying NAC hypopigmentation using ImageJ.

Pigmentation Trajectories

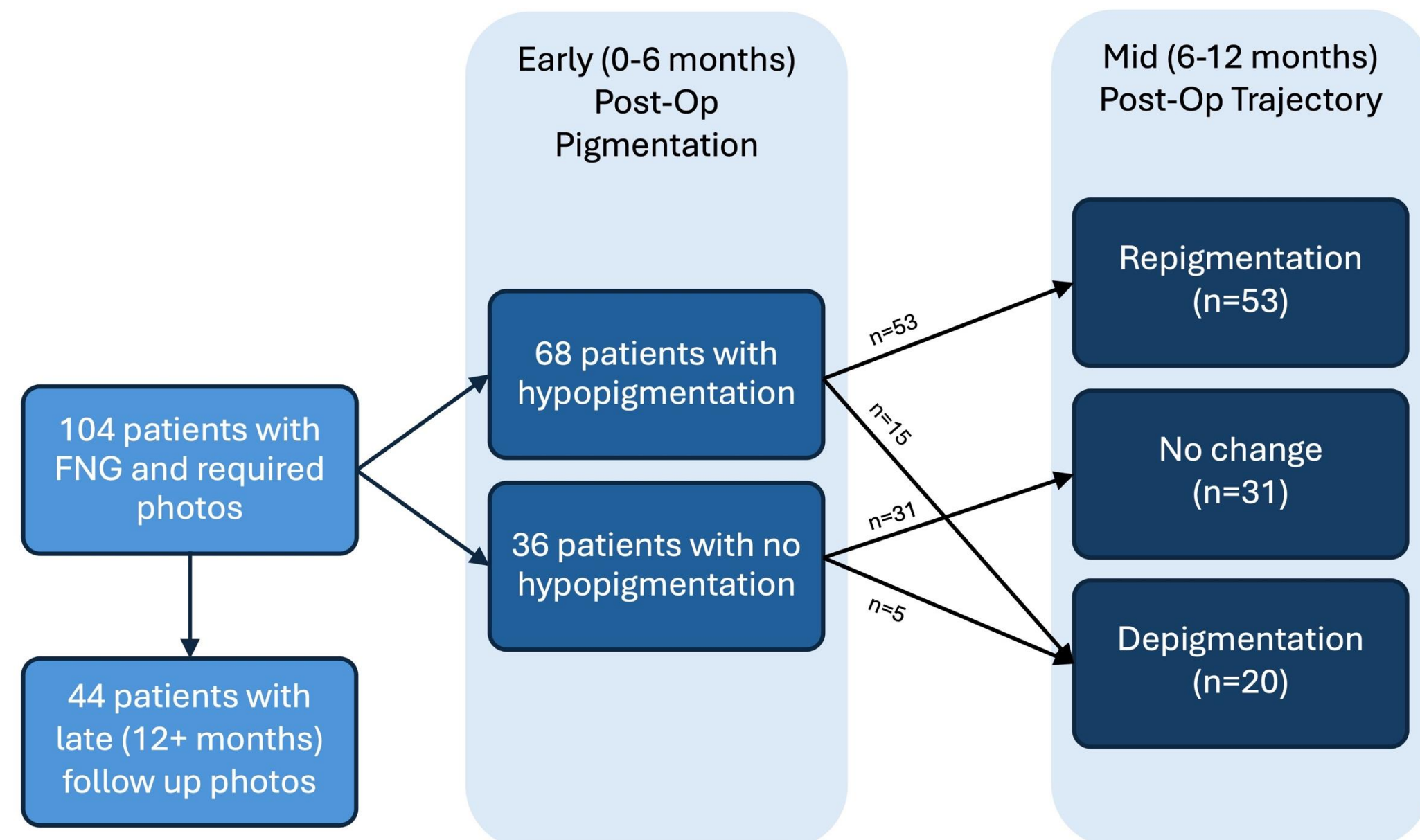


Figure 2. Schematic illustrating classification of patients by pigmentation trajectory between early (0–6 months) and mid (6–12 months) postoperative timepoints, including repigmentation, no change, and depigmentation groups.

Results

Hypopigmentation Outcomes

	Early (0-6 months)	Mid (6-12 months)	Late (12+ months)	p-value
Follow-up time, mean months (range)	1.7 (0.3-5.5)	8.2 (6-11.9)	15.2 (12.1-35.7)	
Hypopigmentation, mean percent $\pm$ SD				
All Patients (n=104)	13.4 $\pm$ 13.6	7.4 $\pm$ 9.5	7.2 $\pm$ 9.3	<0.0001
by initial trajectory				
Repigmentation (n=53)	20.5 $\pm$ 11.1	8 $\pm$ 5.5	4.8 $\pm$ 4.3	<0.0001
No Change (n=31)	0 $\pm$ 0	0 $\pm$ 0	1.6 $\pm$ 4.5	1.000
Depigmentation (n=20)	10.7 $\pm$ 12.2	19.4 $\pm$ 14.5	11.6 $\pm$ 14.1	0.001
by race				
White (n=58)	10.1 $\pm$ 12	7.2 $\pm$ 11.3	6.3 $\pm$ 9	0.162
Black (n=10)	36 $\pm$ 12.5	11.1 $\pm$ 6.4	7.1 $\pm$ 6.6	<0.001
Asian (n=12)	15.4 $\pm$ 10	5.5 $\pm$ 5.7	6.1 $\pm$ 5.1	0.004
Native American (n=4)	14.5 $\pm$ 7.8	11.8 $\pm$ 5.3	6.8 $\pm$ 4.9	--
by ethnicity				
Hispanic (n=21)	16.7 $\pm$ 10.8	7.1 $\pm$ 5.6	7.7 $\pm$ 10.9	0.003
Not Hispanic (n=76)	13.1 $\pm$ 14.4	7.6 $\pm$ 10.5	7.5 $\pm$ 8.9	0.005

Figure 3. Summary of postoperative NAC hypopigmentation across early, mid, and late (>12 months) timepoints for the overall cohort and stratified subgroups, including trajectory-based and demographic comparisons. P-values represent comparisons between early and mid postoperative timepoints using paired t-tests; bolded values indicate statistical significance.

Longitudinal NAC Hypopigmentation Over Time

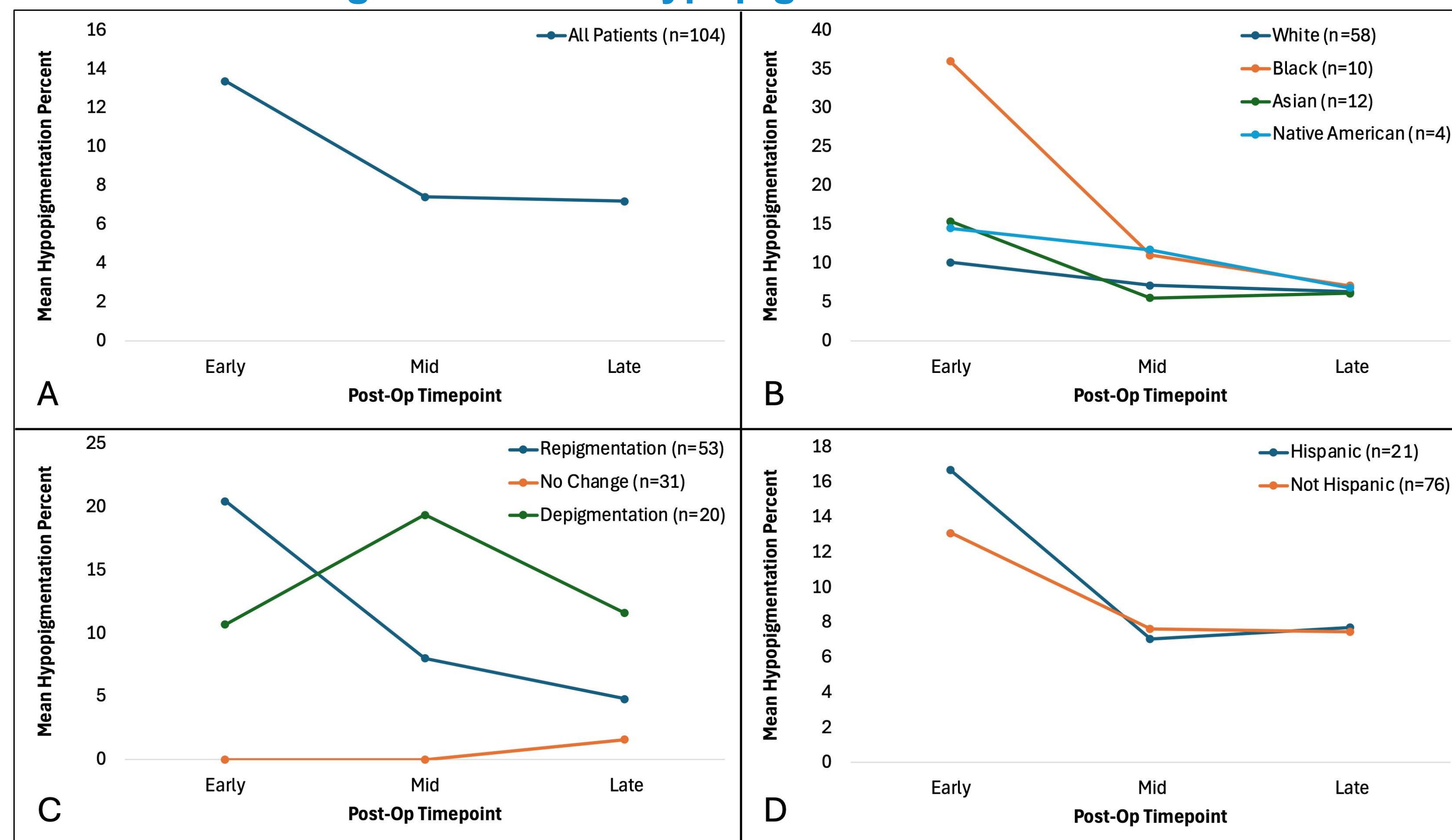


Figure 3. Longitudinal NAC hypopigmentation across postoperative timepoints. Mean hypopigmentation percentage is shown at early (0–6 months), mid (6–12 months), and late (>12 months) postoperative timepoints. (A) Overall cohort. (B) Stratification by race. (C) Stratification by pigmentation trajectory (repigmentation, no change, depigmentation). (D) Stratification by ethnicity.

Key Findings

- 65% of patients demonstrate early NAC hypopigmentation.
- Hypopigmentation improves significantly within the first postoperative year.
- Pigmentation stabilizes after 12 months. Recovery trajectories are heterogeneous.
- Early hypopigmentation is more pronounced in Black patients but improves over time.

Overall, NAC hypopigmentation is common early, often improves, and stabilizes within one year, providing a framework for patient counseling.

Discussion

- NAC hypopigmentation reflects graft-related melanocyte injury and recovery. Improvement within the first year aligns with expected revascularization and melanocyte repopulation.
- Variation in recovery patterns highlights that pigmentation outcomes are not uniform.
- Racial differences likely reflect baseline melanocyte biology and pigment visibility.
- Preoperative counseling should include:
 - Expectation of early hypopigmentation
 - Timeline of recovery (6–12 months)
 - Potential need for secondary interventions

Conclusions

NAC hypopigmentation after FNG is common early but frequently improves within the first year and stabilizes thereafter. These findings provide objective data to guide patient expectations and timing of secondary aesthetic interventions.