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Article

Demographic Predictors of Surgical Intervention and Revision Pathways in Facial Reanimation

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Abstract

Background/Objectives: Facial paralysis is a debilitating condition managed with dynamic (e.g., gracilis or temporalis transfer) and static (e.g., fascial sling) surgical interventions. This study evaluates demographic factors associated with procedure selection and revision pathways. **Methods:** Using the TriNetX database, we identified patients with facial paralysis undergoing gracilis transfer, temporalis transfer, or fascial sling procedures. Demographics (sex, ethnicity, race) were compared across procedure types, and revision patterns were analyzed. **Results:** Dynamic procedures were more common among female patients (35.5% vs 23.8%, OR=1.76, 95% CI [1.47-2.11], $p<0.001$). Non-Hispanic patients were less likely to undergo dynamic procedures than Hispanic patients (OR=0.36, 95% CI [0.26-0.50], $p<0.001$), while non-White patients were more likely than White patients (OR=1.58, 95% CI [1.25-1.99], $p<0.001$). Among patients undergoing initial static procedures, White patients were less likely to transition to dynamic revision compared to non-White patients (OR=0.134, 95% CI [0.07-0.228], $p<0.001$). Gracilis transfer demonstrated the highest revision rate among procedures studied. **Conclusions:** Demographic differences exist in both initial procedure selection and revision pathways for facial reanimation. These findings highlight potential disparities in surgical management and underscore the need to further investigate structural drivers of these differences.

Keywords: facial paralysis; facial reanimation; gracilis free muscle transfer; temporalis transfer; fascial sling; health disparities; surgical outcomes; TriNetX

1. Introduction

Facial expression, which relies upon facial nerve function, is fundamental to communication and social interaction [1]. Loss of this function, or facial paralysis, is debilitating and can lead to significant deterioration in quality of life for patients [1]. Not only can facial paralysis lead to psychosocial impairment, but it can also result in other complications, including feeding difficulties due to oral incompetence and even blindness due to sequelae of incomplete eye closure [2]. Although Bell's palsy is the most common cause of facial paralysis, other etiologies include trauma, infection, and neoplasm [3,4]. A facial reanimation procedure may be indicated for those in whom there is no likelihood of return of facial nerve function [5].

Facial reanimation procedures aim to restore symmetry at rest and with dynamic movement, often with particular attention to the smile [5]. Many surgical options exist to address complete facial nerve dysfunction and are generally categorized as dynamic or static approaches, which differ in their ability to restore facial symmetry at rest versus re-establish active facial movement [5]. Though

static procedures help achieve symmetry at rest and are often utilized for eye closure, dynamic procedures are required to accomplish true mimetic reanimation and movement [6]. A thorough patient evaluation, including the nature of the paralysis and the time since onset, is paramount for determining the appropriate treatment for each case [5]. Primary nerve repair should be performed when feasible in acute traumatic or iatrogenic transections, as it is the most effective method for restoring facial function [7]. However, this repair must be tension-free and performed as soon as possible, typically within the first 30 days [7]. On the other hand, when facial nerve dysfunction is more longstanding or has another etiology, other options must be considered.

Over time, motor endplates atrophy and become unresponsive to reinnervation procedures, typically after 18 months of dysfunction [7]. At that point, surgeons often rely on free muscle transfers or static procedures to restore facial symmetry, which are sometimes used in conjunction [5]. This study focuses on three commonly utilized procedures: the fascial sling, temporalis tendon transfer, and gracilis free-muscle transfer.

Static suspension with a fascial sling can be employed to restore the nasolabial fold and symmetry of the midface [7]. Although this technique may improve oral competence, nasal obstruction, and overall symmetry, it does not provide dynamic functional benefits [7]. The fascia lata is often harvested for this procedure as it provides both length and strength, and multiple strips can be obtained [7]. The static sling procedure is a shorter and less invasive operation than other free tissue transfers. However, it does not contribute to the dynamic smile function and may lead to donor-site morbidity [7].

Another option for longstanding facial paralysis is the temporalis tendon transfer, which involves mobilizing the temporalis tendon at its coronoid insertion and transferring it to the oral commissure [7]. This technique can be performed through a single incision, provides oral reanimation, and results are typically seen within weeks [7]. However, it requires an intact trigeminal nerve, is used almost exclusively for smile reanimation, requires biofeedback training for coordination of voluntary movement, and typically does not restore an emotional smile [5].

Lastly, free muscle transfer, specifically the gracilis, offers several dynamic advantages and can be performed as a single- or two-stage procedure [5]. The procedure involves harvesting the gracilis muscle and the obturator nerve, and transferring them to the midface, typically innervated by a masseter or a cross-facial nerve graft [5]. The gracilis has a reliable neurovascular pedicle, less donor site morbidity than other free muscle flaps, provides good tone at rest, can be inset with multiple vectors, and can provide voluntary movement and some restoration of an emotional smile [7]. However, it is associated with longer operative times, potentially multiple trips to the operating room, possible microvascular complications, and it can take months to years to see functional outcomes [5].

Thorough evaluation of presentation, etiology, timeline, and patient expectations informs operative approaches to address facial nerve dysfunction. Given that the time from initial insult to intervention determines the treatments available to patients, delays in care can result in fewer options or more morbid procedures than would otherwise be needed. Understanding how demographic characteristics influence treatment selection is essential to identifying potential disparities in access to and utilization of facial reanimation procedures.

2. Materials and Methods

In this study, we utilized TriNetX, a global health research network that provides access to over 131 million anonymized electronic medical records from participating healthcare organizations. Institutional review board (IRB) review was waived in accordance with our institutional policy for studies utilizing de-identified TriNetX data. We constructed queries using diagnostic and procedural codes, including the 10th revision of the International Statistical Classification of Diseases (ICD-10) and Current Procedural Terminology (CPT) codes.

We identified patients diagnosed with facial paralysis (ICD-10 G51). Next, we queried patients diagnosed with facial paralysis who subsequently underwent either a gracilis free muscle transfer

(CPT 15842), a temporalis muscle transfer (CPT 15845), or a fascial sling procedure (CPT 15840). We further categorized the procedures into dynamic (gracilis and temporalis muscle transfers) and static (fascial sling) groups. We compared these three groups to identify differences in the demographic characteristics of patients who elected to undergo these initial procedures.

For each identified patient who underwent either fascial sling or gracilis free muscle transfer, we analyzed the occurrence of revision surgery. Revision surgery was defined as any subsequent occurrence of the three CPT codes following the index procedure during the available follow-up period. For patients who underwent temporalis muscle transfer, revisions were defined as subsequent gracilis transfer or fascial sling procedures, as repeat temporalis tendon transfer is not typically performed. We also performed comparative analyses within these groups to determine whether specific demographics were associated with a higher chance of undergoing revision surgery.

For patients who initially underwent a fascial sling procedure and subsequently underwent revision surgery, we characterized whether the revision involved a second fascial sling procedure or a dynamic temporalis or gracilis procedure.

We identified the demographic characteristics of patients who underwent each procedure, including sex, ethnicity, and race. We performed chi-square tests to determine whether there were statistically significant differences in the likelihood of undergoing each procedure across demographic groups. Percentages reported in demographic tables represent the proportion of patients within each demographic group who underwent each procedure. We calculated odds ratios (ORs) and 95% confidence intervals (CIs) for each demographic comparison. $P < 0.05$ was considered statistically significant. Statistical analyses, including chi-square testing and odds ratio calculations, were performed using Microsoft Excel (Microsoft Corporation, Inc., Redmond, WA).

3. Results

Total Facial Paralysis Cohort (ICD-10 G51)

We identified 365,698 patients diagnosed with facial paralysis. The cohort was predominantly female (50.9%, $n=186,162$), non-Hispanic or Latino (57.5%, $n=210,110$), and White (56.5%, $n=206,575$). Overall, 2,382 patients (0.7% of patients in the facial paralysis cohort) subsequently underwent a gracilis free muscle transfer (CPT 15842), a temporalis muscle transfer (CPT 15845), or a fascial sling procedure (CPT 15840). The average age at the time of facial paralysis onset was 49.1 years $\pm$ 20.9 years. Table 1 provides demographic information for the total cohort and initial procedures.

Gracilis Free Muscle Transfer for Facial Paralysis (CPT 15842)

Of the 2,382 patients who underwent surgical intervention, 320 (13.4%) underwent gracilis free-muscle transfer. The cohort for this procedure was predominantly female (57.5%, $n=184$), non-Hispanic or Latino (70.6%, $n=226$), and White (70.6%, $n=226$). The average age at the time of surgery for this procedure was 38.6 years $\pm$ 21.6 years. Of the males who received treatment, 10.1% had gracilis free muscle transfer, compared to 17.3% of females (OR = 0.54, 95% CI [0.42-0.69], $p < 0.001$). Hispanic patients (33.9%) were significantly more likely to undergo the procedure compared to non-Hispanic patients (12.2%) (OR = 3.70, 95% CI [2.63-5.22], $p < 0.001$). Additionally, a significantly lower proportion of White patients (12.8%) underwent gracilis free muscle transfer compared to non-White patients (16.9%) (OR = 0.722, 95% CI [0.534-0.976], $p=0.033$).

Table 1. Demographic Breakdown of Initial Surgical Treatments for Facial Paralysis.

	Static				Dynamic					
	Facial Paralysis		Fascial Sling		Gracilis		Temporalis		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Total	365,698	-	1,688	70.9%	320	13.4%	374	15.7%	2,382	0.7%
Average Age at Index (years)	49.1 ± 20.9		60.6 ± 17.4		38.6 ± 21.6		56.7 ± 18.7			
Sex										
Male	150,287	41.1%	927	76.2%	123	10.1%	167	44.7%	1217	0.810%
Female	186,162	50.9%	686	64.5%	184	17.3%	194	51.9%	1064	0.572%
Ethnicity										
Not Hispanic or Latino	210,110	57.5%	1,364	73.4%	226	12.2%	268	71.7%	1858	0.884%
Hispanic or Latino	48,731	13.3%	87	50.0%	59	33.9%	28	7.5%	174	0.357%
Race										
White	206,575	56.5%	1,280	72.6%	226	12.8%	256	68.4%	1762	0.853%
Non-White	78,832	21.6%	241	62.8%	65	16.9%	78	20.9%	384	16.1%
• Black or African American	38,451	10.5%	113	66.5%	20	11.8%	37	9.9%	170	0.442%
• Asian	17,044	4.7%	43	59.7%	19	26.4%	10	2.7%	72	0.422%
• Native Hawaiian or Other Pacific Islander	2,455	0.7%	10	50.0%	0	0.0%	10	2.7%	20	0.815%
• American Indian or Alaska Native	1,273	0.3%	10	50.0%	10	50.0%	0	0.0%	20	1.571%
• Other Race	19,609	5.4%	65	3.9%	16	5.0%	21	5.6%	102	4.3%

Temporalis Muscle Transfer for Facial Paralysis (CPT 15845)

A total of 374 patients (15.7%) underwent temporalis muscle transfer. This cohort was predominantly female (51.9%, n=194), non-Hispanic or Latino (71.7%, n=268), and White (68.4%, n=256). The average age at the time of surgery for temporalis muscle transfer was 56.7 years±18.7 years. A smaller proportion of male patients underwent temporalis transfer than female patients (13.7% vs. 18.2%, OR = 0.71, 95% CI [0.57-0.89], p=0.003). White patients were significantly less likely to undergo the procedure than non-White patients (OR = 0.67, 95% CI [0.50-0.88], p=0.005). There was no statistically significant difference between Hispanic (16.1%) and non-Hispanic patients (14.4%) (OR = 1.14, 95% CI [0.74-1.74], p=0.55).

Fascial Sling Procedure for Facial Paralysis (CPT 15840)

A total of 1,688 patients (70.9%) underwent the fascial sling procedure. This group was predominantly male (76.2%, n=927), non-Hispanic or Latino (73.4%, n=1,364), and White (72.6%, n=1,280). The average age at the time of surgery was 60.6 years±17.4 years. Females (64.5%) were significantly less likely to undergo the fascial sling procedure compared to males (76.2%) (OR = 0.57, 95% CI [0.47-0.68], p<0.001). Non-Hispanic patients (73.4%) were also significantly more likely to undergo this procedure compared to Hispanic patients (50.0%) (OR = 2.76, 95% CI [2.02-3.78], p<0.001). Similarly, non-White patients (62.8%) were significantly less likely to undergo the procedure than White patients (72.6%) (OR = 0.635, 95% CI [0.503-0.800], p<0.001).

Dynamic (Gracilis and Temporalis) vs. Static (Fascial Sling) Procedures

A total of 694 (29.1%) patients underwent dynamic procedures (gracilis or temporalis muscle transfers), while 1,688 (70.9%) underwent the static suspension with a fascial sling. Female patients were significantly more likely to undergo dynamic procedures compared with male patients (35.5% vs 23.8%, OR = 1.76, 95% CI [1.47-2.11], p<0.001). Non-Hispanic patients were significantly less likely to undergo dynamic procedures than Hispanic patients (26.6% vs. 50.0%, OR = 0.36, 95% CI [0.26-0.50], p<0.001). Non-White patients were significantly more likely to undergo dynamic procedures compared to White patients (OR = 1.58, 95% CI [1.25-1.99], p<0.001).

Revision Surgeries

Revision surgery occurred following all three index procedures, with rates of 14.4% for gracilis transfer, 9.9% for temporalis transfer, and 13.4% for fascial sling procedures.

Revision Surgeries for Gracilis Free Muscle Transfer (CPT 15842)

Detailed demographic breakdowns for the revision cohorts are presented in Table 2. A total of 46 patients (14.4%) who underwent gracilis free-muscle transfer subsequently underwent revision surgery. Revision occurred in 15 male patients (12.2%) and 31 female patients (16.8%), with no statistically significant difference between sexes (OR = 0.685, 95% CI [0.353-1.331], p=0.2630). There was no significant difference in revision rates between Hispanic and non-Hispanic patients (16.9% vs 15.5%, OR = 0.898, 95% CI [0.416-1.939], p=0.7838). However, non-White patients had significantly higher odds of revision than White patients (46.2% vs 15.9%, OR = 4.524, 95% CI [2.473-8.275], p<0.001).

Table 2. Demographic Breakdown of Revisions After Surgical Treatments.

	Static		Dynamic				Total Revision Procedures	
	Revision After Fascial Sling		Revision After Gracilis		Revision After Temporalis			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Total	227	13.4%	46	14.4%	37	9.9%	310	13.0%
Average Age at Index (years)	60.1 ± 18.7		44.2 ± 18.4		51 ± 21.2			
Sex								
Male	116	12.5%	15	12.2%	19	11.4%	150	12.3%
Female	107	15.6%	31	16.8%	18	9.3%	156	14.7%
Ethnicity								
Not Hispanic or Latino	209	15.3%	35	15.5%	30	11.2%	274	14.7%
Hispanic or Latino	10	11.5%	10	16.9%	10	35.7%	30	17.2%
Race								
White	185	14.5%	36	15.9%	26	10.2%	247	14.0%
Non-White	39	16.2%	30	46.2%	20	25.6%	89	23.2%
Black or African American	19	16.8%	10	50.0%	10	27.0%	39	14.0%
Asian	10	23.3%	10	52.6%	0	0.0%	20	22.9%
Native Hawaiian or Other Pacific Islander	0	0.0%	0	0.0%	0	0.0%	0	27.8%
American Indian or Alaska Native	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other Race	10	15.4%	10	62.5%	10	47.6%	30	29.4%

Revision Surgeries for Temporalis Muscle Transfer (CPT 15845)

A total of 37 patients (9.9%) who underwent temporalis muscle transfer required revision surgery. Revision occurred in 19 male patients (11.4%) and 18 female patients (9.3%), with no statistically significant difference between sexes (OR = 1.255, 95% CI [0.635-2.480], $p=0.5121$). Hispanic or Latino patients demonstrated significantly higher revision rates following temporalis muscle transfer than non-Hispanic patients (35.7% vs 11.2%, OR = 4.41, 95% CI [1.86-10.43], $p<0.001$). White patients had significantly lower odds of revision than non-White patients (10.2% vs 25.6%; OR = 0.332, 95% CI [0.171-0.628], $p=0.0005$).

Revision Surgeries for Fascial Sling Procedure (CPT 15840)

Among patients who underwent an initial fascial sling procedure ($n = 1,688$), 310 subsequent revision procedures were identified during follow-up. Of these, 227 (73.2%) involved repeat sling procedures, while 83 (26.8%) involved conversion to dynamic reanimation procedures, including 46 gracilis transfers and 37 temporalis transfers. Revision occurred in 116 male patients (12.5%) and 107 female patients (15.6%), with no statistically significant difference between sexes (OR = 1.292, 95% CI [0.973-1.716], $p=0.0760$). There was no statistically significant difference between Hispanic and non-Hispanic patients (11.5% vs 15.3%, OR = 1.393, 95% CI [0.709-2.737], $p=0.3335$). Similarly, revision rates did not differ significantly between White and non-White patients (14.5% vs 16.2%, OR = 0.875, 95% CI [0.600-1.275], $p=0.4870$).

Among patients undergoing revision after an initial fascial sling procedure, the majority (73.2%, $n=227$) underwent a secondary fascial sling procedure. Hispanic or Latino patients were significantly less likely than non-Hispanic patients to undergo repeat sling revision rather than transition to a dynamic procedure (30.3% vs 85.3%, OR = 0.085, 95% CI [0.038-0.193], $p<0.001$). White patients were significantly more likely than non-White patients to undergo repeat sling revision (83.0% vs 39.4%, OR = 7.490, 95% CI [4.394-12.767], $p<0.001$). No significant sex differences were observed (OR = 1.464, 95% CI [0.775-2.762], $p=0.2382$).

Among patients who underwent gracilis free muscle transfer following an initial fascial sling procedure ($n = 46$), Hispanic or Latino patients were significantly more likely to undergo gracilis revision compared to non-Hispanic patients (23.1% vs 4.4%, OR = 6.518, 95% CI [1.568-27.096], $p=0.0034$). White patients were significantly less likely than non-White patients to undergo gracilis revision (4.5% vs 30.3%, OR = 0.108, 95% CI [0.050-0.232], $p<0.001$). No significant sex differences were observed ($p=0.98$).

Among patients who underwent temporalis transfer following an initial sling procedure ($n = 37$), White patients were significantly less likely than non-White patients to undergo temporalis revision (12.6% vs 30.3%, OR = 0.330, 95% CI [0.184-0.592], $p=0.0001$). No statistically significant differences were observed by sex ($p=0.17$) or ethnicity ($p=0.18$).

When evaluating transition from sling to any dynamic procedure (gracilis or temporalis combined, $n = 83$), White patients had significantly lower odds of transitioning to dynamic revision compared to non-White patients (17.0% vs 60.6%, OR = 0.134, 95% CI [0.07-0.228], $p<0.001$). No statistically significant associations were observed for sex ($p=0.2382$) or ethnicity ($p=0.5294$).

4. Discussion

Facial paralysis is a devastating condition that results in both functional and aesthetic impairments of the eyes, nose, and mouth. It is estimated to affect 20 to 30 per 100,000 people per year [8]. Manifestations of facial paralysis range from flaccid paralysis to synkinesis with a broad range of severity. Given the high societal value placed on facial symmetry and function, some patients elect to undergo surgical intervention, which may be in the form of static and/or dynamic reanimation. Of affected patients, only a small fraction undergo surgical correction. Early facial reanimation techniques emerged in the mid-20th century with the development of free muscle transfer procedures, including the gracilis, latissimus dorsi, and pectoralis [9]. With continued advancements in reconstructive surgery, techniques such as the fascia lata sling and local temporalis transfer have emerged as less invasive means of achieving improved static and/or dynamic function.

Although these techniques have been used for over 80 years, the literature on patient selection and demographic factors remains sparse.

Most of the literature has focused on demographic factors associated with surgical intervention for facial paralysis. Consistent with the literature, our study found that the average age at which patients underwent surgical intervention for facial paralysis was around 49 years [9]. One previous study reported an increased incidence of surgical intervention for facial paralysis among White patients who also underwent intervention at an older age compared with non-White patients [10]. They also found a higher likelihood of males than females undergoing cutaneous free tissue transfer and fascial slings [10].

Our study identified significant demographic trends not only in the initial procedure selection but also in the surgical escalation pathways pursued when revision surgery was required. To our knowledge, this is the first large database study examining demographic differences in revision pathways following facial reanimation procedures. Female, Hispanic, and non-White patients were more likely to undergo dynamic procedures as initial intervention. However, among patients initially undergoing static sling placement, only race was significantly associated with transition to dynamic revision procedures.

While overall sling revision rates did not significantly differ by race, the type of revision following sling did. Among patients requiring revision after initial sling placement, White patients were significantly more likely to undergo repeat sling revision. In contrast, non-White patients were substantially more likely to transition to dynamic revision procedures (gracilis or temporalis transfer). This suggests that racial differences may influence the surgical pathway chosen when revision is required. Furthermore, these findings provide a foundation for future work aimed at identifying modifiable factors contributing to these differences and improving equity in facial reanimation care.

Prior literature in otolaryngology has often demonstrated that White patients undergo surgical intervention at higher rates than non-White patients, particularly in oncologic settings [11]. In contrast, our cohort demonstrated a more balanced racial distribution among patients undergoing facial reanimation procedures, with 56.5% identified as White [10]. Despite this, non-White patients had significantly higher odds of revision following dynamic procedures and were substantially more likely to transition from static to dynamic revision procedures, suggesting differences in surgical escalation pathways. These findings suggest that disparities in facial reanimation may extend beyond procedure selection to differences in revision pathways following surgery.

Although White patients comprised a slightly larger proportion of the surgical cohort, non-White patients demonstrated significantly higher odds of revision following dynamic procedures. However, racial differences were not observed in overall sling revision rates but were evident in the type of revision pursued after fascial sling placement. Gracilis demonstrated the highest revision rate among individual procedures (14.4%), followed closely by fascial sling (13.4%), which may, in part, be explained by the need for flap debulking, resuspension procedures, or other free flap complications. Most free flap surgeries occur at large academic centers rather than in community settings, which may influence patient selection and access to care [12]. These racial differences in reanimation procedure selection and revision rates may be partly due to the nature of surgery offered or patient factors such as insurance type, zip code, and geographic location, which have been shown to influence access to elective surgery [13].

Additionally, we observed gracilis free-muscle transfer performed more often in younger patients than fascial sling or temporalis transfer. During free muscle transfer, a younger age may allow for a healthier patient population and the ability to tolerate additional procedures, including second-stage reconstruction and/or revision. Our results highlight essential new demographic trends and potential disparities in the surgical management of facial paralysis, suggesting the need for further investigation into the underlying causes and possible strategies to address these differences.

These findings may reflect broader structural and cultural factors influencing surgical counseling, access to subspecialty care, and patient preferences. Further studies investigating

additional demographic factors, such as zip code, income, and education level, should be conducted to better elucidate the contributing factors to these racial and cultural differences in facial paralysis management and treatment access.

Limitations

First, we cannot independently verify TriNetX's accuracy and completeness. Second, the study's retrospective nature limits our ability to establish causality between demographic factors and the likelihood of undergoing specific surgical procedures or revisions. Third, categorizing race and ethnicity into broad groups may overlook essential nuances and variations within these populations, potentially masking more specific trends. Additionally, the study did not account for socioeconomic factors (as these are "restricted terms" within TriNetX), comorbidities, or other potential confounders that could influence surgical decision-making and outcomes. Additionally, coding timestamps may not always reflect the true timing of treatment or diagnosis. Nevertheless, our study provides valuable insights into the demographic disparities in surgical management for facial paralysis and underscores the need for further investigation into these differences. Future research should address these limitations by incorporating prospective study designs, more granular demographic categorizations, and comprehensive data on socioeconomic and clinical factors.

5. Conclusions

Facial paralysis imposes substantial functional and psychosocial burdens, and only a small fraction of affected patients undergo surgical reanimation. In this multicenter database study, we found that procedure type and revision patterns differ by sex, race, and ethnicity. Female, Hispanic, and non-White patients were more likely to undergo dynamic procedures as initial interventions. Among patients initially treated with a static fascial sling, non-White patients were more likely to undergo dynamic revision. In contrast, male, non-Hispanic, and White patients more often remained within static approaches. Gracilis free muscle transfer demonstrated the highest revision rates, consistent with its technical complexity and staged nature. These findings suggest that disparities in facial reanimation may manifest not only in procedure selection but also in revision-escalation pathways, underscoring the importance of examining the structural drivers of surgical decision-making. Future work incorporating socioeconomic and structural determinants of health may clarify the drivers of these inequities and inform more equitable care for patients with facial paralysis.

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Data Availability Statement: The data supporting the findings of this study were obtained from the TriNetX research network through institutional access. All relevant aggregated data generated and analyzed during this study are included within the article. Additional data may be made available from the corresponding author upon reasonable request, subject to institutional policies and TriNetX data use agreements.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

CI	Confidence interval
CPT	Current Procedural Terminology
EHR	Electronic Health Record
ICD-10	International Classification of Diseases, 10th Revision
IRB	Institutional Review Board
OR	Odds Ratio

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