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ORIGINAL RESEARCH

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Change in surgeon for revision rhinoplasty: The impact of patient demographics and surgical technique on patient retention

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Abstract

Objectives: A subset of patients who require revision rhinoplasty will change surgeons for their second procedure. We sought to investigate the rate of surgeon change and identify associated predictors using a population-based, ambulatory surgery database.

Methods/study design: In this retrospective review, 9172 rhinoplasty procedures over a 5-year period were analyzed using the Healthcare Cost and Utilization Project (HCUP) Florida State Ambulatory Surgery and Services Database (SASD). We identified 380 patients who had at least two rhinoplasty procedures between 2009 and 2014. Logistic regression analysis was used to identify predictors of patients changing surgeons for their second documented rhinoplasty.

Results: Among the 380/8531 (4.4%) patients who underwent a revision rhinoplasty, 117/380 (30.8%) patients changed surgeons for their subsequent procedure within a 5-year period. Multivariable logistic regression identified a lower likelihood of surgeon change in patients undergoing functional or cosmetic cartilage grafting procedures (OR 0.342, 95%CI 0.155-0.714, P = .006) and in patients who self-paid for their procedure (OR 0.476, 95%CI 0.225-0.984, P = .048). One hundred twenty-four patients underwent a cosmetic revision rhinoplasty and were twice as likely to change surgeons as those who underwent functional revision rhinoplasty (OR 2.042 95%CI 1.046-4.050, P = .038). Time elapsed (>2 years) was positively correlated with likelihood of surgeon change (OR 1.236, 95%CI 1.153-1.333, P < .001).

Conclusion: In our analysis, 30.8% of patients changed surgeons for their revision rhinoplasty. Cartilage grafting at the time of index procedure and cash payment correlated with a decreased likelihood of surgeon change. Patients were more likely to change surgeons with increased time elapsed or for an aesthetic revision. Clarifying features associated with surgeon change may help improve patient satisfaction and retention.

KEYWORDS
patient retention, patient satisfaction, revision rhinoplasty, surgeon change

1 | INTRODUCTION

Optimizing patient satisfaction has become an increasingly prominent focus among health organizations, policy makers, and private physician practices. Characteristics predicting patient satisfaction after primary and secondary rhinoplasty have been previously reported, with studies demonstrating the impact of factors such as patient expectations, finances, history of substance abuse, and poor social support on perceived rhinoplasty outcome.[1-3] A unique consideration among elective surgeries prone to subsequent revision procedures is the prospect of patients changing surgeons for their second procedure.

A subset of patients who undergo revision rhinoplasty will change surgeons for their second procedure, but the mutable factors that influence the odds of surgeon change remain unknown. While predictable circumstances such as changes in geography, income, or insurance may affect a patient's probability of changing surgeons for revision rhinoplasty, it is possible that other clinicodemographic factors or characteristics of the index surgery have a significant impact. Understanding factors that influence the odds of surgeon change may offer insight into this phenomenon and help to improve the likelihood of patient retention and satisfaction.

In this study, we used a large, population-based ambulatory surgery data set encompassing over nine thousand rhinoplasty procedures over a five-year period to identify patients who changed surgeons for their secondary procedure. The aim of this study was to analyze patients undergoing rhinoplasty who changed surgeons and understand whether there were intrinsic patient characteristics or surgical factors that were associated with surgeon change.

2 | METHODS

2.1 | Data source and inclusion criteria

Data was extracted from the HCUP Florida State Ambulatory Surgery and Services Database spanning the years 2009 and 2014.[4] The Florida database was chosen based on availability of patient and physician-specific identifiers that were necessary to ascertain surgeon change for secondary rhinoplasty. Only adult patients over the age of 18 with CPT codes corresponding to rhinoplasty or septorhinoplasty who had undergone at least one procedure between 2009 and 2014 were included (Table 1). CPT codes 30400, 30410, 30420, 30430, 30435, and 30450 were used to filter for rhinoplasty procedures, and CPT codes 30465, 30520, 20912, 21210, 21230, and 14760 were unbundled to identify additional rhinoplasty procedural components (Table 1). Patients who underwent septoplasty alone or who did not have the necessary patient or physician-linking identifiers were excluded. A change in unique physician identifier code was considered an indication that a patient had changed surgeons between procedures. Surgeon volume tercile was calculated by dividing the number of unique cases performed by each surgeon by the number of unique years in which their physician identifier appeared within the database. Patient demographic characteristics were identified using ICD-9 codes (Table 1). Institutional Review Board approval was not necessary for this study as no human or animal subjects were used and all data in the State Ambulatory Surgery and Services Database is de-identified.

2.2 | Statistical analysis

A Fisher's exact test was used to identify baseline differences between patient cohorts. Univariable and multivariable logistic regression analyses were performed to identify factors predictive of change in surgeon for revision rhinoplasty. A *P*-value less than .05 was considered the threshold of statistical significance.

TABLE 1 CPT codes used to identify rhinoplasty and associated procedures

	CPT code	Procedure
CPT codes used to filter for rhinoplasty procedures	30400	Rhinoplasty, primary; lateral and alar cartilages and/or tip
	30410	Rhinoplasty, primary; complete, bony pyramid, lateral and alar cartilages, nasal tip
	30420	Rhinoplasty, primary; including major septal repair
	30430	Rhinoplasty, secondary; minor nasal tip revision
	30435	Rhinoplasty, secondary; intermediate revision with osteotomies
	30450	Rhinoplasty, secondary; major revision, nasal tip and osteotomies
CPT codes used to identify additional procedural components	30465	Repair of nasal vestibular stenosis
	30520	Septoplasty or submucous resection
	20912	Septal cartilage graft, septal donor site
	21210	Bone graft to nose
	21230	Rib cartilage graft to nose
	21235	Ear cartilage graft to nose
	14760	Composite graft to nose

2.3 | Rhinoplasty revision analysis

Clinicodemographic factors accounted for in our logistic regression model included age, sex, race, income quartile, insurance payer, history of acquired nasal deformity, psychiatric history, deviated septum, nasal obstruction, and whether or not surgery was desired for cosmetic reasons. Surgical features in our regression analysis included septoplasty, osteotomies, cartilage grafting, repair of vestibular stenosis, and surgeon volume tercile. The cartilage grafting variable encompassed septum, ear, and rib donor sites.

2.4 | Surgeon change analysis

Factors significant on univariable logistic regression and factors of clinical interest were included in our multivariable logistic regression models. Patient demographic factors included age, sex, race, insurance payer, income quartile, history of psychiatric illness, history of nasal trauma, and whether or not the index or revision procedures were performed for cosmetic reasons. Urban/rural designation was not included in this model as 96% of cases were performed in an urban area, leaving this variable underpowered. As there was only one patient in the "Asian" race category, this category was combined with "Other" race. Surgical factors included whether or not septoplasty, osteotomy, cartilage graft, or repair of vestibular stenosis were performed during the index procedure. Time elapsed between surgeries and surgeon volume tercile were also included. Payer change between surgeries was not included in the analysis as this variable was found to be colinear with time elapsed.

3 | RESULTS

9172 rhinoplasty cases and 8531 unique patients were identified in the Florida State Ambulatory Surgery Database between 2009 and 2014 (Table 1). The average patient age at the time of surgery was 41.0 years, with a SD of 16.6 years. 3229 patients were male, and 5943 were female. 4.4% of all patients underwent revision rhinoplasty. 2148 patients underwent a cosmetic rhinoplasty for their index procedure; the revision rate among these patients was 5.8%. Cartilage grafting was performed in 1761 (19.2%) of rhinoplasty cases, of which 1602 (90.9%) were functional and 159 (9.1%) were cosmetic.

3.1 | Surgeon change analysis

380 patients underwent revision surgery and were included in the surgeon change analysis. 117/380 (30.8%) patients changed surgeons for their subsequent procedure. 73.5% of patients who changed surgeons were female. Multivariable logistic regression identified a lower likelihood of surgeon change in patients who underwent cartilage grafting during functional or cosmetic rhinoplasty (OR 0.342, 95% CI 0.155-0.714, P = .006) and in patients whose primary payer was categorized as "Self-Pay" (OR 0.476, 95% CI 0.225-0.984, P = .048) (Table 2).

One hundred and twenty-four patients underwent revision surgery for cosmesis; these patients were twice as likely to change surgeons as those who underwent functional revision rhinoplasty (OR 2.042 95% CI 1.046-4.050, P = .038). The surgeon change rate for cosmetic revision was 35.5%, and two-thirds (66.9%) of all patients who underwent cosmetic revision had a cosmetic index procedure. Variable interaction analysis revealed no correlation between cosmetic revision surgery and age (P = .128), sex (P = .729), or history of psychiatric illness (0.286). Surgeons in the "high volume" tercile defined as performing more than 52 procedures per year demonstrated a trend towards lower likelihood of their patients changing surgeons for their second procedure, however, this did not reach statistical significance (OR 0.447, 95% CI 0.180-1.029, P = .068). On variable interaction analysis, surgeon volume was not correlated with cartilage grafting (medium volume: P = .8905, high volume: P = .799), osteotomy performance (medium volume: P = .631, high volume: P = .421), or repair of vestibular stenosis (medium volume: P = .299, high volume: P = .131). Cartilage grafting and cosmetic surgery variables were also not colinear (P = .864).

Increased time elapsed between surgeries was associated with a higher likelihood of surgeon change (OR 1.236, 95% CI 1.153-1.333, P < .001) (Table 3). The average time elapsed between surgeries was 4.02 quarters (SD 3.85 quarters). There was no interaction between age and time elapsed variables (P = .426). Our variable indicating a change in payer between surgeries was found to be colinear with time elapsed (P = .04), thus this payer change variable was excluded from multivariable analysis. Patients were four times as likely to change surgeons if more than two years had elapsed between surgeries (OR 4.12, 95% CI 2.28-7.57, P < .001), nearly nine times as likely if more than three years had elapsed (OR 8.83, 95% CI 3.64-24.75, P < .001), and nineteen times as likely if more than four years had elapsed (OR 19.23, 95% CI 3.47-358.89, P = .01). Psychiatric history was not associated with change in surgeon (OR 1.858, 95% CI 0.386-8.244, P = .416).

4 | DISCUSSION

The present study identifies the rate and factors predictive of surgeon change for revision rhinoplasty. We found an overall revision rhinoplasty rate of 4.4%, which is slightly higher than the previously established 3.1% rate.[5] Nearly one third of these patients changed surgeons for their second documented procedure. This noteworthy finding has not previously been described in the literature. Rhinoplasty is associated with a particularly low rate of patient satisfaction; thus, this patient group is especially vulnerable with regard to patient retention.[3] As patient satisfaction and retention are increasingly being used as quality metrics for the performance of physicians, practices, and health systems, it is critical that we gain insight into this phenomenon.[6]

TABLE 2 Multivariable analysis of factors associated with change in surgeon for revision rhinoplasty

	OR	95% CI Low	95% CI High	*P*-value
Patient characteristics				
Age	1.001	0.982	1.021	.890
Sex				
Male	1.000			
Female	1.400	0.780	2.557	.265
Income quartile				
<$39 999	1.000			
$40 000 to $50 999	1.418	0.609	3.444	.427
$51 000 to $65 999	1.911	0.843	4.561	.130
>$66 000	1.580	0.670	3.885	.305
Race				
White	1.000			
Black	2.387	0.410	12.705	.304
Hispanic	1.303	0.566	2.891	.521
Asian/Other	1.301	0.342	4.599	.686
Insurance				
Private	1.000			
Medicaid	0.847	0.186	3.331	.819
Medicare	1.406	0.505	3.880	.510
No charge/other	0.612	0.211	1.619	.339
Self-pay	0.476	0.225	0.984	.048
Acquired deformity				
No	1.000			
Yes	1.097	0.618	1.951	.752
Index procedure performed for cosmesis				
No	1.000			
Yes	0.525	0.248	1.088	.087
Revision procedure performed for cosmesis				
No	1.000			
Yes	2.042	1.046	4.050	.038
Psychiatric history				
No	1.000			
Yes	1.858	0.386	8.244	.416
Surgical factors				
Septoplasty				
No	1.000			
Yes	0.651	0.317	1.301	.232
Osteotomy				
No	1.000			
Yes	0.671	0.397	1.129	.134
Cartilage graft				
No	1.000			
Yes	0.342	0.155	0.714	.006
Repair of vestibular stenosis				
No	1.000			
Yes	1.708	0.630	4.501	.282
Time elapsed between surgeries (quarters)	1.236	1.153	1.333	<.001
Surgeon rhinoplasty volume tercile				
1	1.000			
2	1.012	0.538	1.882	.969
3	0.447	0.180	1.029	.068

TABLE 3 Effect of time elapsed between surgeries on likelihood of surgeon change

	Likelihood of surgeon change			
Years elapsed	OR	95% CI low	95% CI high	*P*-value
1	2.50	1.60	3.93	<.001
2	4.12	2.28	7.57	<.001
3	8.83	3.64	24.75	<.001
4	19.23	3.47	358.89	.01

Recently, a study by Spataro et al examined the factors predictive of revision rhinoplasty.[5] They found that revision was more likely in patients who were young, female, had a history of anxiety or autoimmune disease, or desired surgery to repair a cosmetic, acquired, or congenital nasal deformity.[5] The association between age and patient satisfaction is not definitive as reported in cumulative, existing literature with multiple studies demonstrating contradictory findings. A study by Arima and colleagues found a strong positive correlation between increased age and satisfaction, noting that younger patients often have higher expectations and a stronger desire for peer approval.[7] In contrast, Yang and colleagues found that young patients reported greater satisfaction rates after aesthetic rhinoplasty than their older counterparts.[3] Other studies have shown that male sex and psychiatric comorbidities negatively impact satisfaction after rhinoplasty.[8] This data has prompted formation of patient selection criteria and labeling of certain demographic groups as "difficult patients."[9] In our analysis, age, sex, and psychiatric history were not correlated with likelihood of revision surgery, suggesting the need to reevaluate the greater paradigm of patient selection.

We found that factors protective against surgeon change included cartilage grafting and cash payment at the time of index procedure. Patients who had undergone cartilage grafting were three times less likely to change surgeons than those who had not. Within the constraints of the database, we were unable to determine the indication for cartilage grafting, and this variable could represent a wide variety of tip strut, onlay, alar, dorsal, or spreader grafts.

However, prior studies have shown similar results, with patient reported outcome measures improving if the rhinoplasty procedure contained functional components or resulted in aesthetically pleasing nasal architecture.[10-12] For example, Koybasi et al showed that nasal functional improvement as determined by the Rhinoplasty Outcomes Evaluate scale leads to improved patient satisfaction, and Neaman et al demonstrated that addressing preoperative tip deformities reduces revision rhinoplasty rates.[12,13] Although we found no interactions between surgeon volume, cosmetic or functional surgery designation, and cartilage grafting variables, further investigation is warranted as cartilage grafting may indicate a more severe preoperative deformity. A potential explanation for a higher retention rate among self-paying patients is that some nasal surgeons may reduce their cosmetic fees on their own revision cases. Other technical factors including osteotomies, septoplasty, and vestibular stenosis repair were not significantly associated with the likelihood of surgeon change in this study.

Patients who desired an aesthetic revision were twice as likely to change surgeons compared to those undergoing functional revision. Importantly, this finding was independent of patient age, sex, psychiatric history, and whether or not their index procedure was cosmetic or functional. Two-thirds of these patients had undergone an index cosmetic procedure, suggesting that patient goals may have been incompletely understood at the time of the first surgery, or that nasal deformities may have persisted. Neaman et al performed a study of patient satisfaction after cosmetic rhinoplasty and found that 15.4% of patients were dissatisfied, most commonly due to residual dorsal hump or drooping nasal tip.[13] Cosmetic rhinoplasty is a technically challenging procedure with significant psychosocial implications for the patient, so a high rate of dissatisfaction is not surprising. However, patients who undergo a cosmetic revision rhinoplasty are more likely to be ultimately satisfied with their outcome compared to those undergoing functional revision.[14] Our data supports this claim, as 71% of second revision cases in our data set were functional rhinoplasties. Our findings with regard to cosmetic rhinoplasty emphasize the importance of achieving a strong understanding of the patient's goals and setting realistic expectations.

In our study, the factor that correlated most strongly with surgeon change was the amount of time elapsed between surgeries. Expectedly, time elapsed significantly correlated with a variable indicating change in insurance payer between surgeries, and this could explain the higher rate of surgeon change. We were unable to directly assess interaction between geographic relocation and time elapsed, though we established a lack of correlation between time elapsed and age variables.[15] These assessments may have limited value since many patients undergo revision rhinoplasty well beyond the four-year maximum follow up interval provided by our data set. For the Facial Plastic Surgeon, prompt evaluation of patient satisfaction and revision of any remaining issues may improve patient retention.

As a large database study, this investigation is not without limitations. First, patient decision making is multifactorial, and there may be factors unrelated to those captured in this database that play a role in surgeon change. HCUP databases, which rely on the accurate coding of ICD-9 and CPT codes by physicians, nurses, and health care staff, are liable to misclassification bias. Using a unique physician identifier code is another limitation, as this variable does not distinguish between surgeons and surgeon groups. Multiple surgeons may operate within a single group, thus, our rate of surgeon change may in fact be an underestimate. Additionally, there is significant overlap in CPT codes for rhinoplasty, which may confound a detailed analysis of technical components implicated in revision and surgeon change. For example, vestibular stenosis repair is often performed with spreader grafting, which could be miscoded as a cartilage graft. Finally, our analysis only includes five years of data. As patients routinely undergo revision rhinoplasty decades after their first procedure, there may be factors implicated in revision and surgeon change that are not obvious within our data set.

Our study found that patient retention for revision rhinoplasty has more to do with ensuring an adequate cosmetic outcome and restoring proper nasal architecture than it does with patient-centric factors such as age, sex, or psychiatric history. Patient decision making is multifactorial and influencing factors are likely broader than the scope of this study. On a global scale, our findings suggest that thorough exploration of patient goals and attention to both functional and aesthetic outcomes during rhinoplasty are paramount to improving patient satisfaction and preventing surgeon change. Future investigation may include prospective studies on factors implicated in surgeon change and an analysis of surgeon change as a quality metric in Facial Plastic Surgery.

5 | CONCLUSIONS

This retrospective study identified the rate and factors predictive of change in surgeon for revision rhinoplasty. The surgeon change rate was 30.8% among patients undergoing revision rhinoplasty. Patients undergoing revision rhinoplasty for aesthetic purposes were twice as likely to change surgeons for their second procedure than those who sought a functional revision, independent of age, sex, or psychiatric illness. Cartilage grafting at the time of index procedure and cash payment were associated with decreased likelihood of surgeon change for a revision procedure. Time elapsed (>2 years) since initial nasal surgery was positively correlated with likelihood of surgeon change.

CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

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