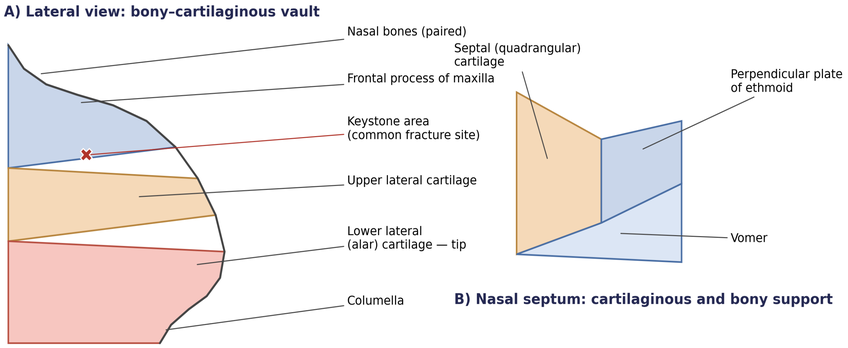
Comparative Effectiveness of Open Versus Closed Nasal Fracture Reduction: A Multi-Institutional Propensity-Matched Cohort Study

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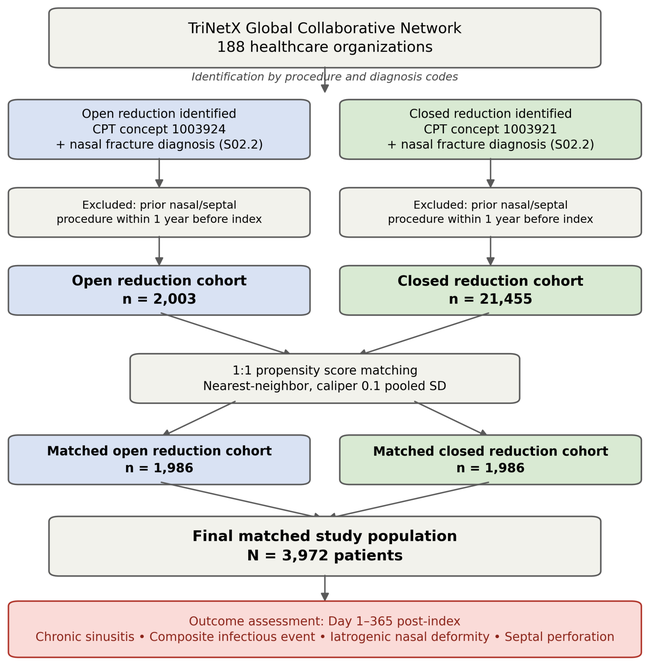
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INTRODUCTION

- Nasal fractures are the most common facial fractures and may result in persistent obstruction, septal deviation, and cosmetic deformity.
- **Closed reduction** remains first-line for simple fractures, whereas open reduction provides direct visualization for complex, displaced, or septal-involving injuries.
- **Prior literature** is limited to small, single-center retrospective series; reported revision rates range from approximately 5% to 50% depending on the presence of septal injury.
- **Septal fractures** specifically are a major risk factor for persistent symptoms and long-term morbidity, regardless of the reduction technique used.
- **No prior study** has leveraged a large, multi-institutional electronic health record network to quantify comparative postoperative risk between open and closed reduction at scale.
- **Objective:** To compare one-year postoperative complication rates between open and closed nasal fracture reduction across infectious and structural outcomes using a large multi-institutional dataset.



METHODS



RESULTS

Table 1: Baseline Characteristics of Patients Undergoing Open vs. Closed Nasal Fracture Reduction

Characteristic	Before Matching: Open (n=2,003)	Before Matching: Closed (n=21,455)	p-value	After Matching: Open Matched (n=1,986)	After Matching: Closed Matched (n=1,986)
Demographics					
Age, mean (SD), y	45.6 (17.9)	40.0 (18.9)	<0.001	45.6 (17.9)	46.2 (19.2)
Female sex, %	37.8	37.6	0.872	37.8	35.8
White race, %	72.1	73.3	0.216	72.1	72.9
Black or African American, %	8.9	9.4	0.450	8.9	9.3
Hispanic or Latino, %	14.9	13.6	0.132	14.9	14.9
Comorbidities					
Diabetes mellitus, %	6.4	5.6	0.143	6.4	5.5
Tobacco use, %	2.1	3.0	0.029	2.1	1.6
Nicotine dependence, %	12.9	13.3	0.694	12.9	12.3
COVID-19 infection, %	1.9	3.2	0.001	1.9	1.9

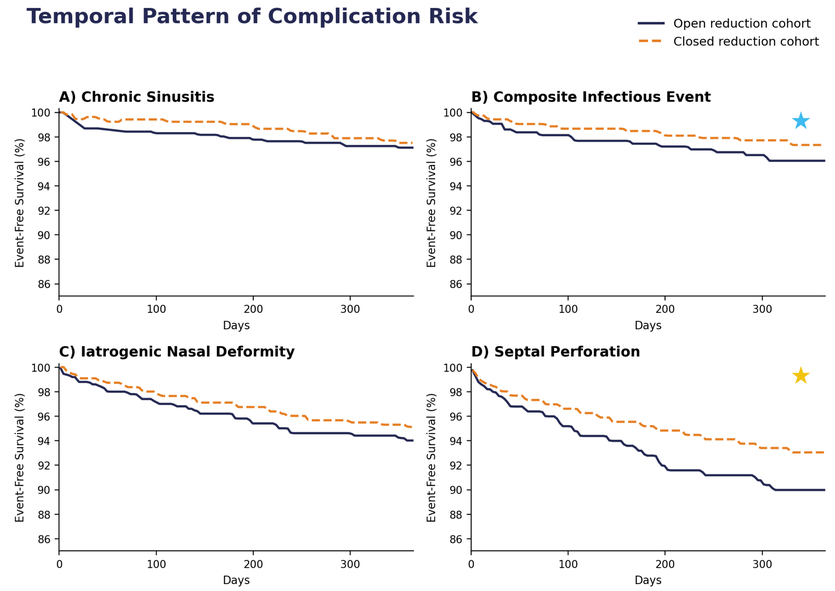
Table 2: One-Year Postoperative Complications, Open vs. Closed Nasal Fracture Reduction

Outcome	Open Risk	Closed Risk	Risk Ratio (95% CI)	Hazard Ratio (95% CI)	p
Chronic Sinusitis	2.3%	1.9%	1.19 (0.76–1.85)	1.18 (0.75–1.84)	p = 0.470
Composite Infectious Event	3.3%	2.1%	1.54 (1.04–2.30)	1.53 (1.02–2.29)	p = 0.036
Iatrogenic Nasal Deformity	4.9%	3.9%	1.27 (0.92–1.74)	1.27 (0.92–1.76)	p = 0.148
Septal Perforation	8.2%	5.5%	1.48 (1.13–1.95)	1.51 (1.13–2.00)	p = 0.004

Note: Only septal perforation remained significant after Holm-Bonferroni correction for multiple comparisons (Discussion).

REFERENCES





Most Robust Finding: Septal Perforation

HR 1.18

Chronic sinusitis risk, 1 year
(not significant, p=0.470)

HR 1.51

Septal perforation risk, 1 year
(higher with open reduction, p=0.004)

DISCUSSION

- **Selective structural signal:** Only septal perforation showed a robust, multiplicity-corrected association with open reduction (HR 1.51, p=0.004); chronic sinusitis and iatrogenic nasal deformity showed no significant difference between techniques.
- **Borderline infectious signal:** The composite infectious event was nominally significant (p=0.036) but did not survive Holm-Bonferroni correction for multiple comparisons, and should be treated as hypothesis-generating rather than confirmatory.
- **Limitations:** Retrospective design cannot capture fracture severity or septal displacement; outcome ascertainment relies on ICD-10-CM/CPT coding rather than chart-confirmed adjudication.
- **Implications:** Findings support individualized surgical approach selection guided by fracture complexity, rather than a blanket assumption of uniformly higher risk with open reduction.

CONCLUSION

- Open reduction was not associated with uniformly greater postoperative morbidity compared with closed reduction. The observed increase in septal perforation occurred in the setting of substantial baseline septal pathology, suggesting that injury complexity may contribute to this association. Surgical approach should therefore remain individualized to fracture characteristics rather than presumed differences in overall complication risk.

ACKNOWLEDGEMENT

The authors acknowledge the TriNetX Global Collaborative Network for data access and the Clive O. Callender Outcomes Research Center at Howard University College of Medicine for institutional support.