

Osteocutaneous Free Flaps in Mandibular and Maxillary Reconstruction: Examining the Impact of Flap Type, Defect Characteristics, and Patient Factors on Postoperative Outcomes



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Abstract

Background: This study examines the rehabilitation of facial defects with the use of osteocutaneous free flaps and factors affecting postoperative outcomes.

Methods: Retrospective chart review of patients undergoing flap repair of mandibular and maxillary defects at Atrium Health Wake Forest Baptist Hospital (2010–2020). Patients were selected from a surgical database (2010–2020) and de-identified. Multivariable analyses and logistic regression were conducted to determine associations between patient factors, osteocutaneous flap characteristics, and postoperative outcomes of reconstruction.

Results: Patients: 177. Gender: 103/177 (58%) male, 74/177 (42%) female. Flap type: scapula 83/177 (47%), parascapula 67/177 (38%), fibula 27/177 (15%). Venous congestion was associated with defect type ($p=0.017$): maxillary defects demonstrated the lowest rate, while combined maxilla-mandible defects demonstrated the highest. Flap type was significantly associated with necrosis ($p=0.034$) and infection ($p=0.038$). Fibula flaps showed the highest necrosis and infection rates, while scapula flaps showed the lowest rates (OR 0.25, 95% CI: 0.07–0.78, $p=0.019$; OR 0.31, 95% CI: 0.09–0.98, $p=0.048$). Flap type was not associated with postoperative flap revision ($p=0.064$). Smokers demonstrated 3.32-fold increased odds of wound dehiscence (OR 3.32, 95% CI: 1.17–10.2, $p=0.028$). No associations were found with cancer type, defect size, flap size, or radiation.

Conclusion: Combined mandible and maxillary defects demonstrated the highest complication rates following free flap reconstruction. Scapula flaps reconstructed multiple defect types with the lowest complication rates. Fibula flaps were associated with the highest rates of necrosis and infection and are suited for select defects. Smoking significantly increased wound dehiscence.

Introduction

- Surgical reconstruction of mandible and maxilla defects typically involves the use of **osteocutaneous free flaps (OFF)** to restore function and appearance.¹
- Infection, flap thrombosis, wound hemorrhage, and incision dehiscence can complicate complex, large reconstructions.²
- This study investigates how patient factors and osteocutaneous free flaps characteristics affect postoperative outcomes of mandible and maxillary reconstruction.

Materials and Methods

Retrospective chart review of patients undergoing osteocutaneous free flap repair of mandibular and maxillary defects at Atrium Health Wake Forest Baptist Hospital between 2010–2020.

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Results

The sample included 177 patients who underwent reconstruction with OFF, specifically:

- Scapula flaps**, 47% (83/177).
- Parascapula flaps**, 38% (67/177).
- Fibula flaps**, 15% (27/177).

• **(A) Venous congestion** was significantly associated with **defect type** ($p=0.017$). Combined defects showed the highest rates.

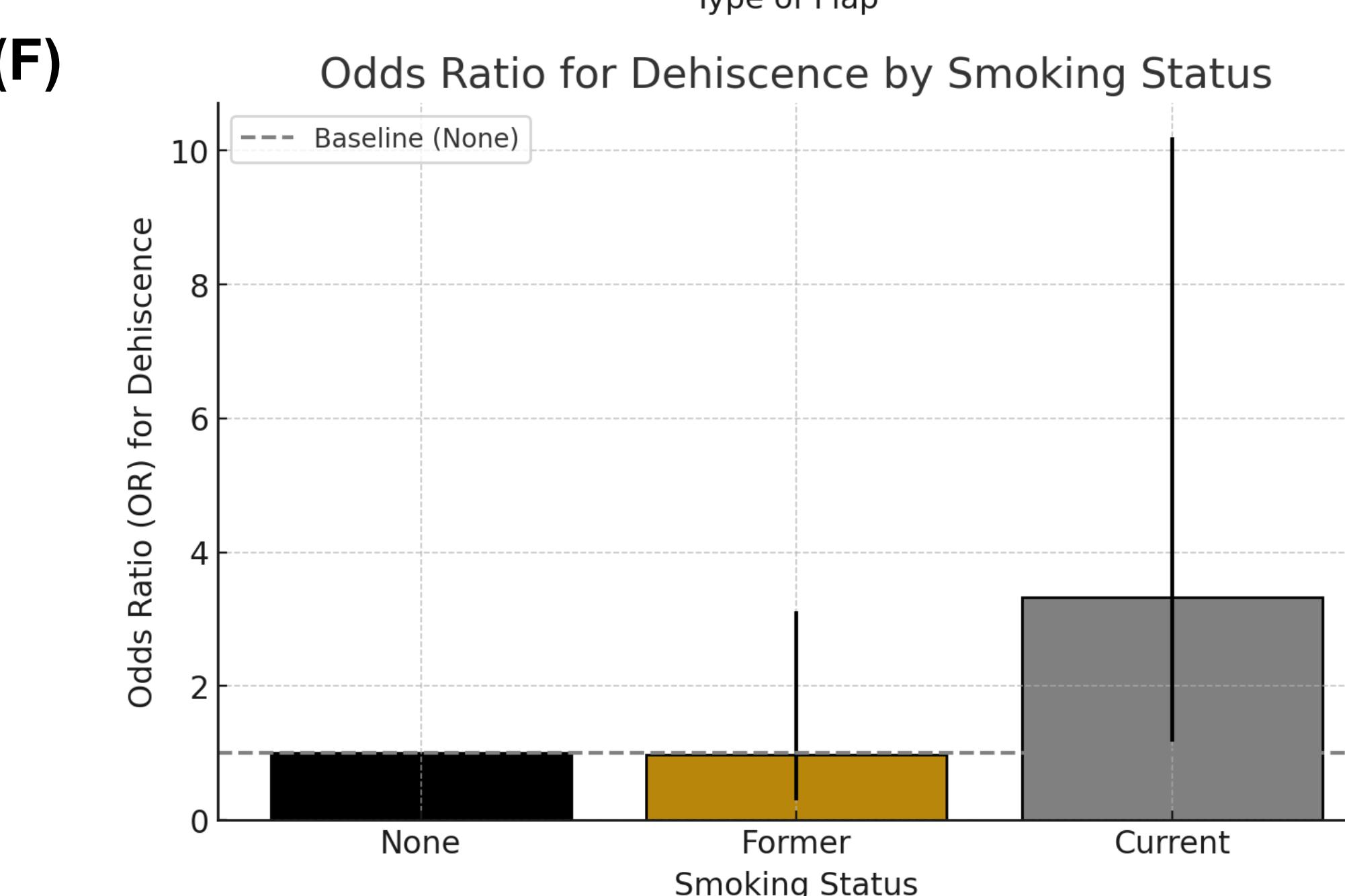
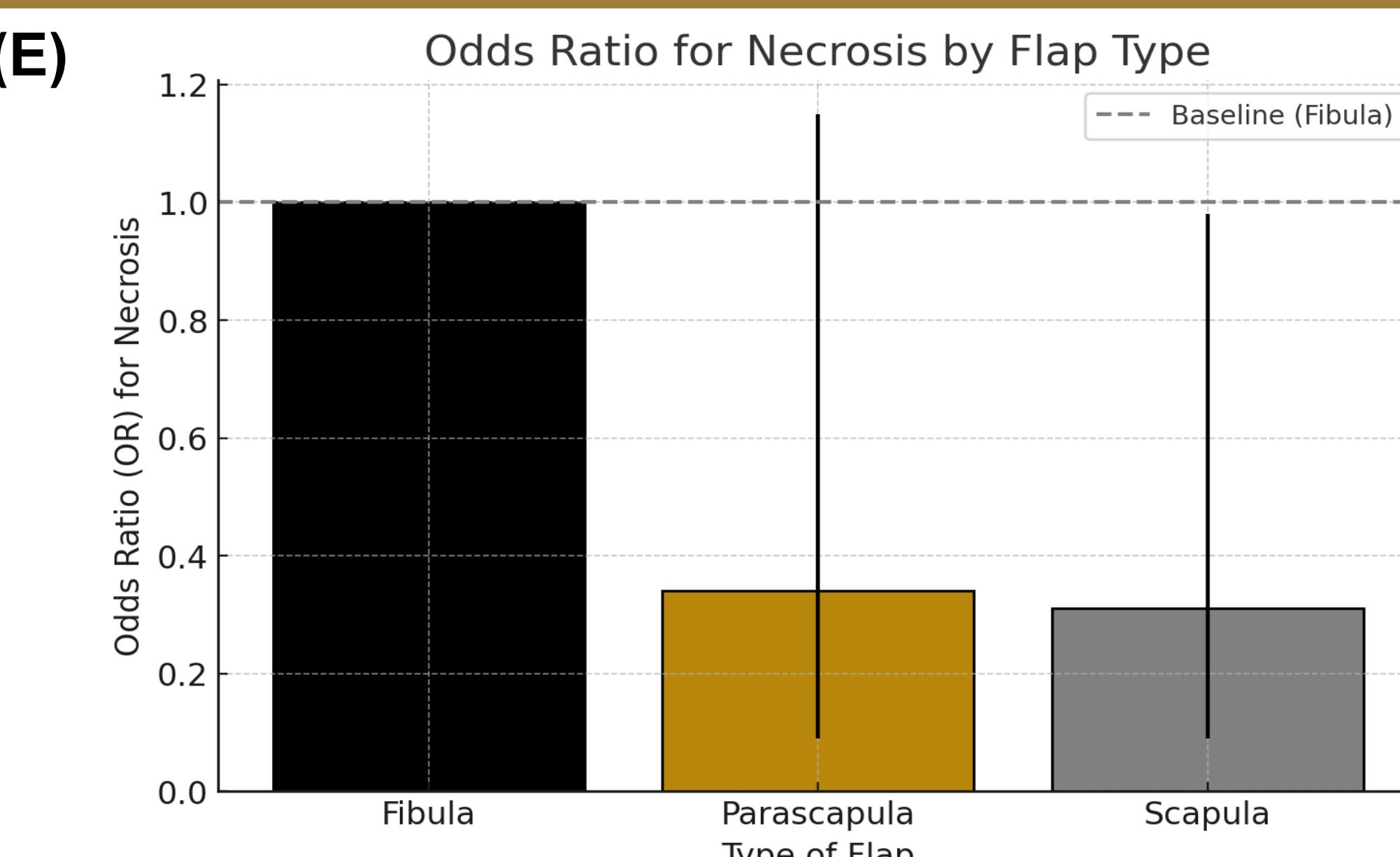
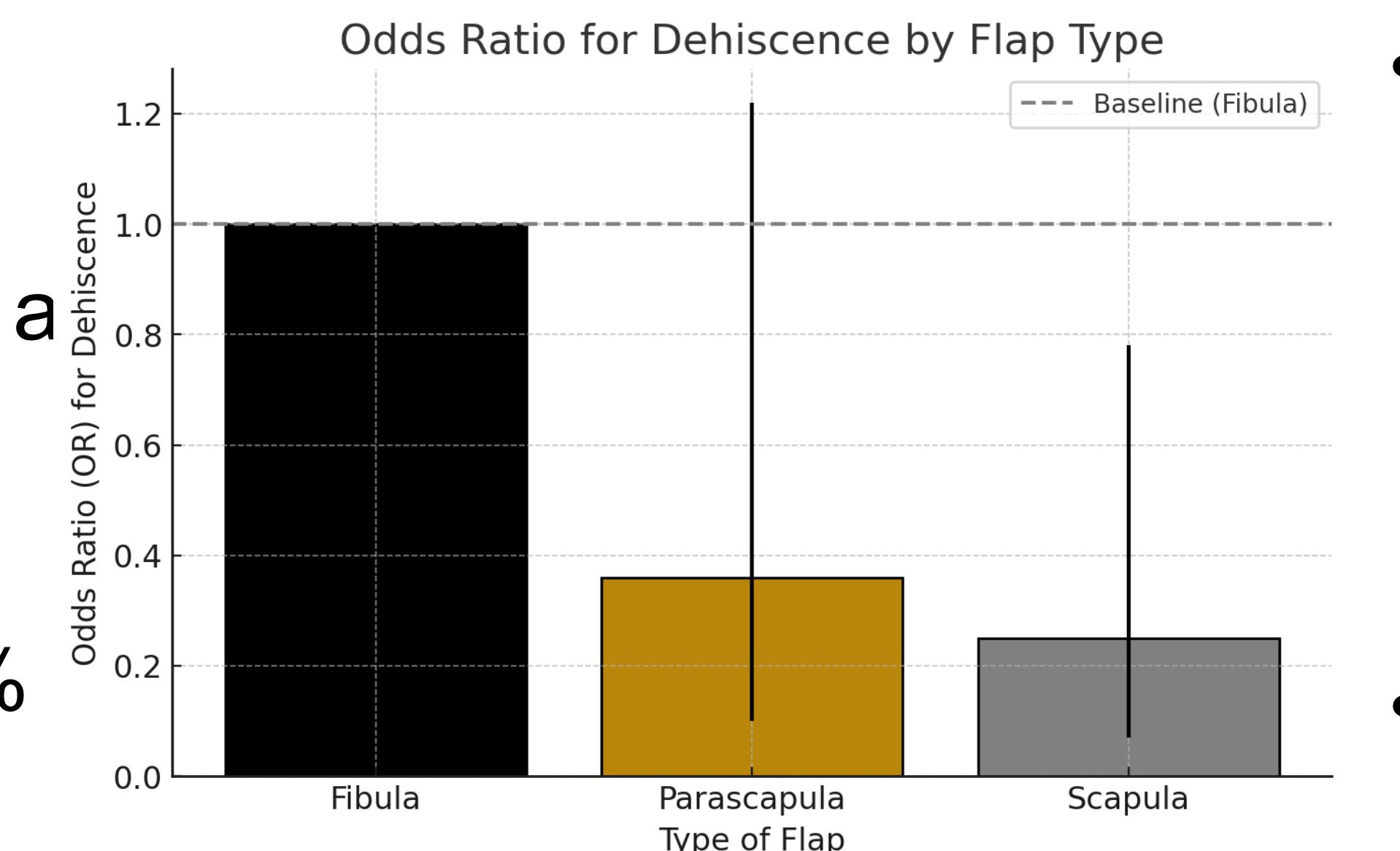
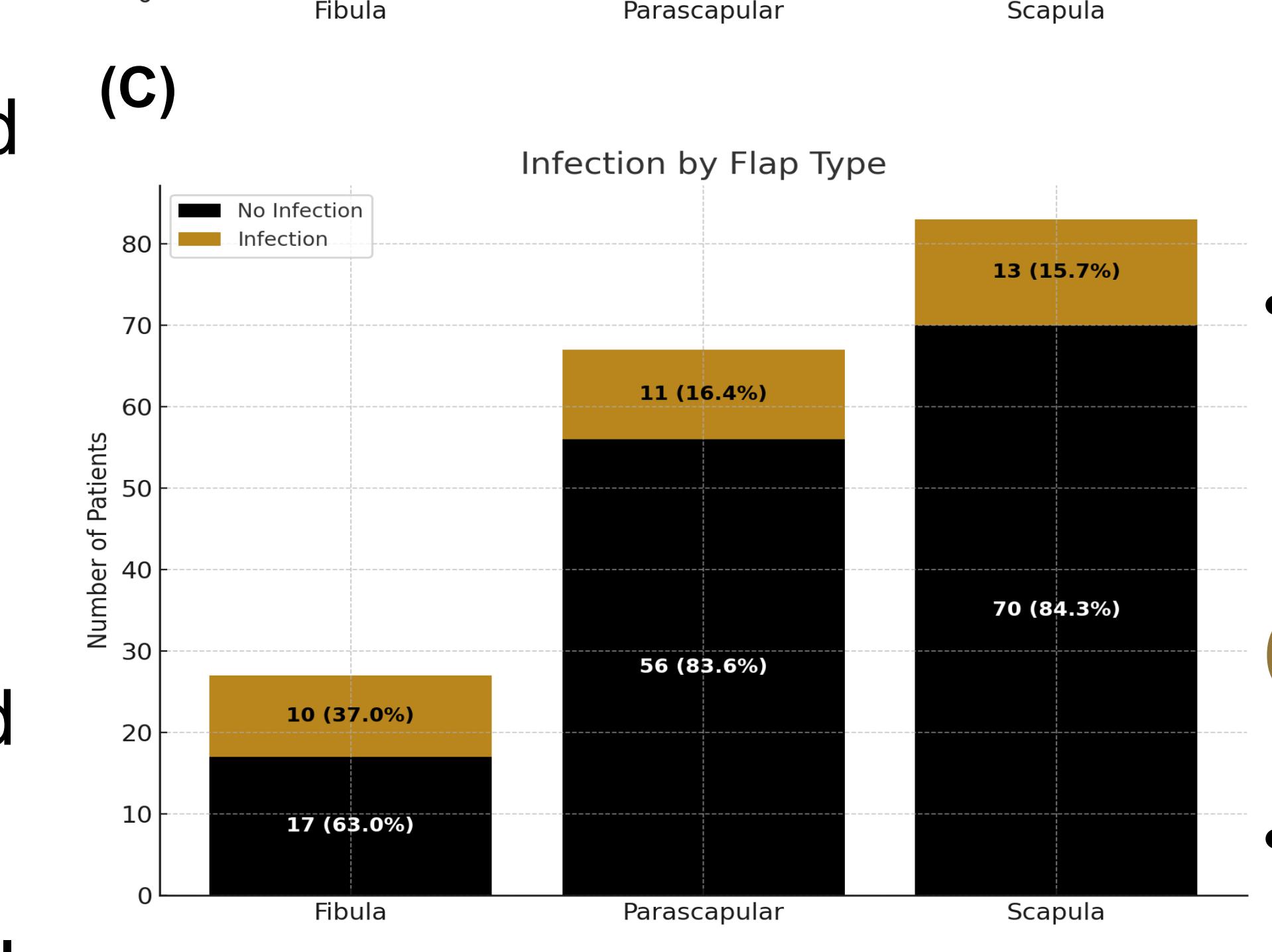
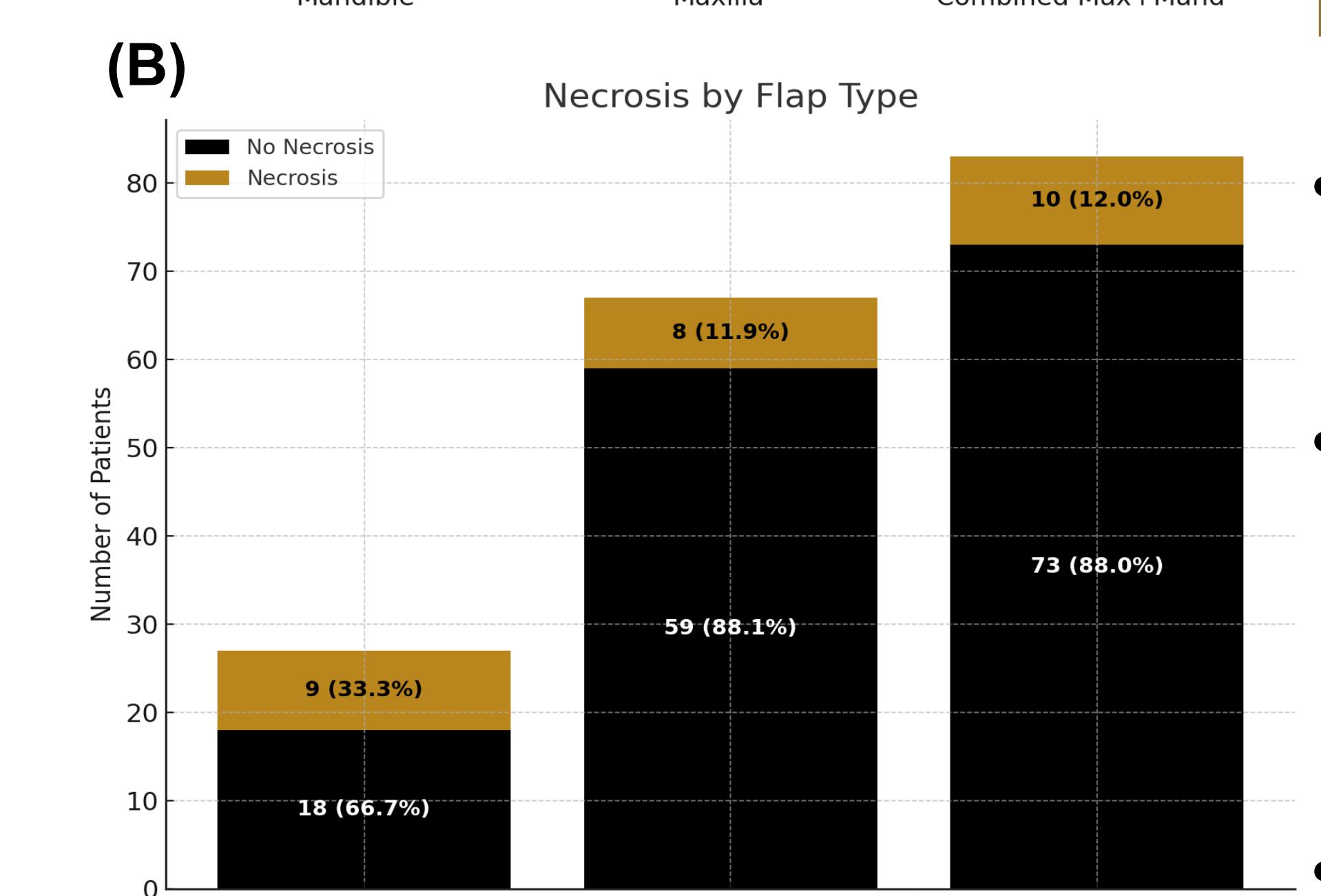
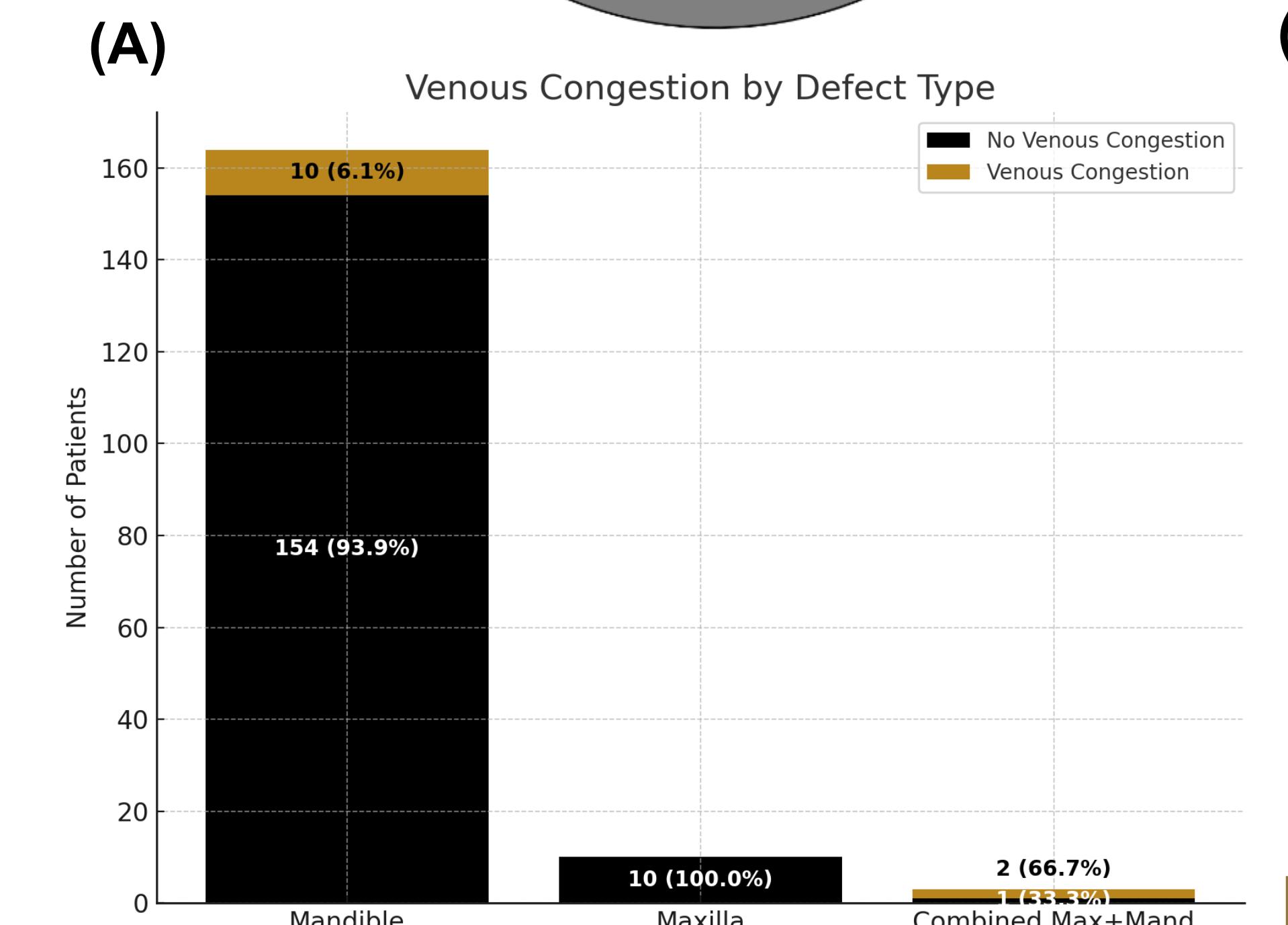
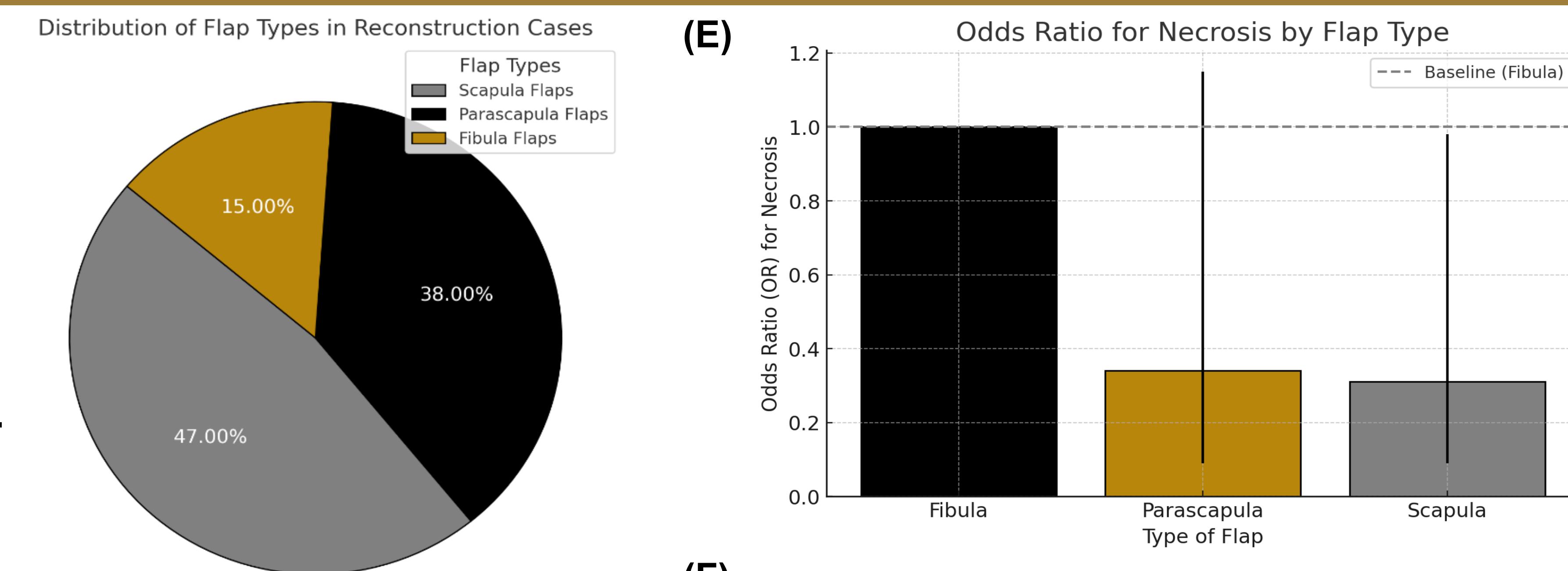
• **(B) Flap type** was significantly associated with postoperative **necrosis** ($p=0.034$). Fibula flaps demonstrated the highest rate.

• **(C) Flap type** was significantly associated with **infection** ($p=0.038$). Fibula flaps demonstrated the highest rate.

• **(D) Scapula flaps** showed the lowest odds of postoperative wound **dehiscence** (OR 0.25, 95% CI: 0.07–0.78, $p=0.019$).

• **(E) Scapula flaps** showed the lowest odds of postoperative wound **necrosis**. (OR 0.31, 95% CI: 0.09–0.98, $p=0.048$).

• **(F) Current smokers** had a 3.32-fold higher odds of postoperative wound **dehiscence** compared to non-smokers (OR 3.32, 95% CI: 1.17–10.2, $p=0.028$).



Discussion

- Combined reconstructions showed highest venous congestion rates.
- Fibula flaps may be best reserved for younger, vascularly healthy patients needing long bone segments.
- Scapula flaps may be a lower-morbidity option for elderly or comorbid patients.
- Smoking increased dehiscence risk, underscoring the need for perioperative cessation strategies.

Conclusion

- Combined defects produced the highest rate of venous congestion.
- Fibula flaps were associated with high complications and should be reserved for healthy patients. Scapula flaps demonstrated low rates of necrosis and may be used for patients with comorbidities.
- Smoking was associated with postoperative wound complications.

References

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