

Introduction

- Mandibular defects can result in significant functional and aesthetic sequelae requiring free flap reconstruction.
- Advantages of the fibula flap include ample bone stock, low donor site morbidity, and feasibility of dental implantation.
- Its postoperative aesthetic outcomes, however, have not yet been quantitatively defined.

Objective: This study examines predictors of postoperative facial symmetry outcomes in patients who have undergone fibula free flap reconstruction of the mandible.

Methods

- This was a retrospective review of 32 patients.
- Resting position postoperative photographs at a minimum of 6 months after mandibular reconstruction were obtained for facial symmetry analysis using Emotrics, an artificial intelligence software.
- Brow height (BH), marginal reflex distance (MR), oral commissure excursion (CE), smile angle (SA) and dental show (DS) were evaluated.
- Difference in means using ANOVA and two-tailed T test were significant if $p < 0.05$.

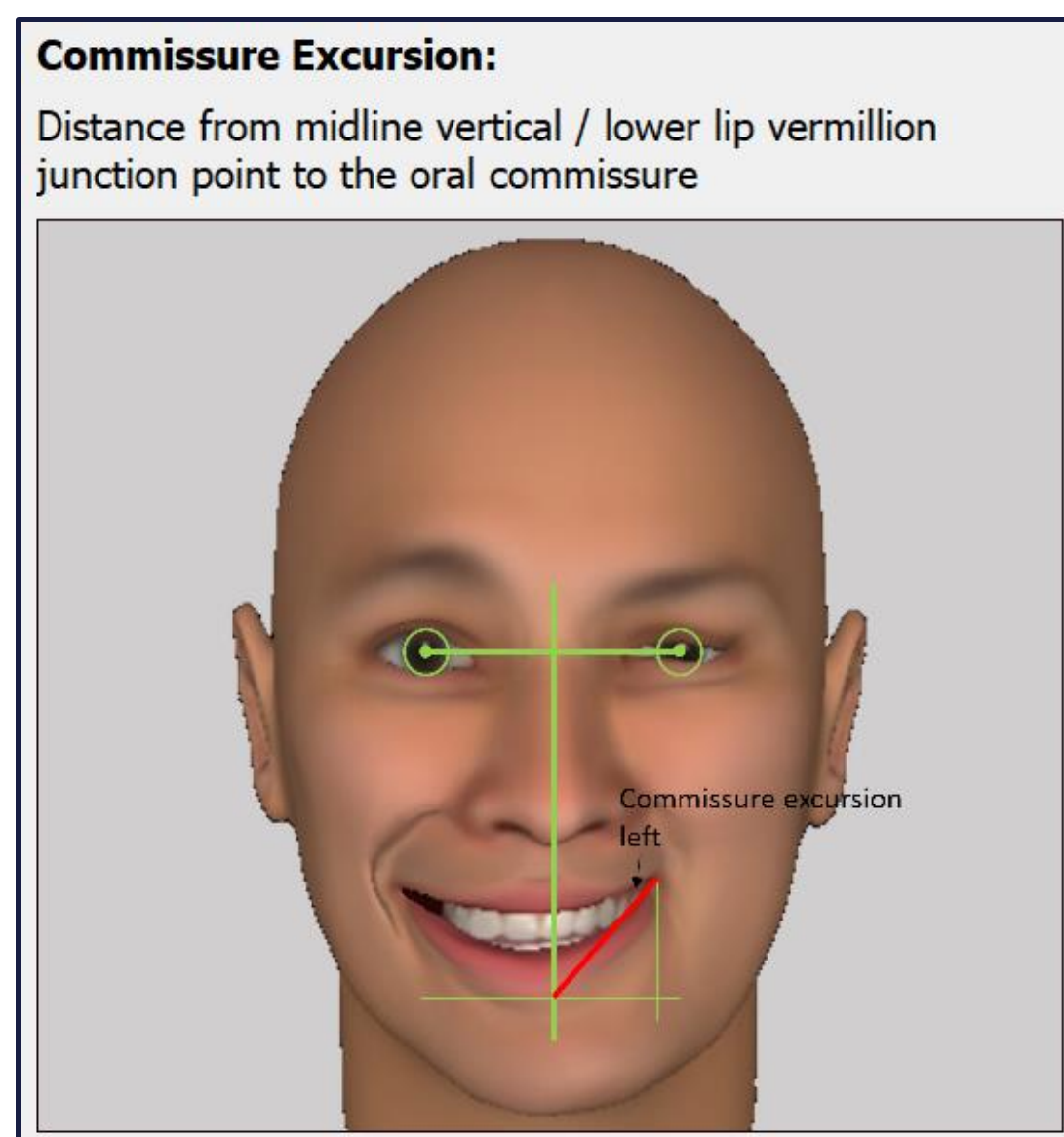


Figure 1: Emotrics AI symmetry calculation (ex. Oral commissure excursion)

Results

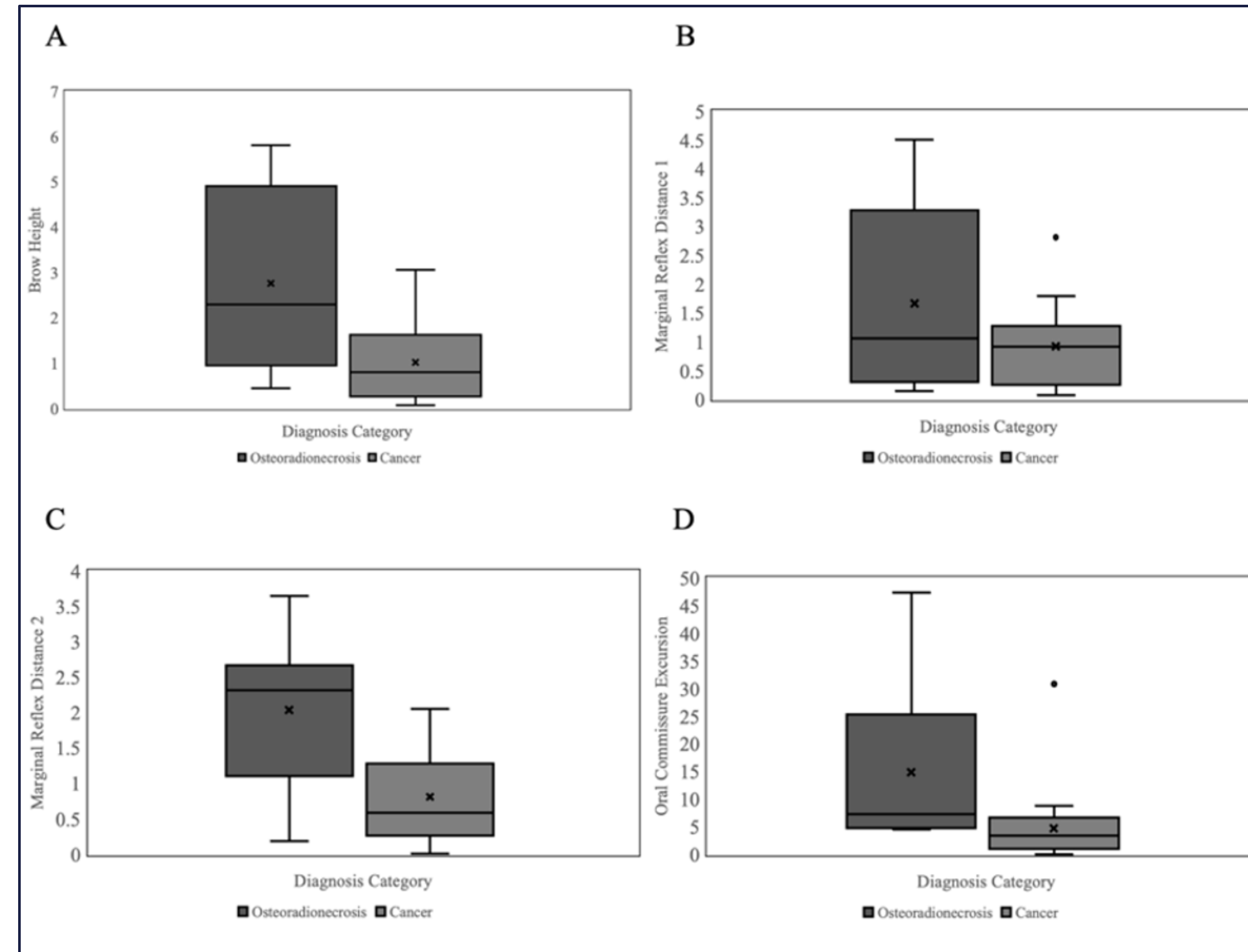


Figure 2: A) Osteoradionecrosis diagnosis is associated with decreased BH symmetry (2.76 mm versus 1.01 mm, $p < 0.05$). B) Osteoradionecrosis diagnosis is associated with decreased MR1 distance symmetry (1.67 mm versus 0.92 mm, $p < 0.05$). C) Osteoradionecrosis diagnosis is associated with decreased MR2 distance symmetry (2.03 mm versus 0.81 mm, $p < 0.05$). D) Osteoradionecrosis diagnosis is associated with decreased oral CE symmetry (14.84 mm versus 4.73 mm, $p < 0.05$).

	Average Oral Commissure Excursion Difference	Significance (ANOVA between groups)
One Fragment	4.02	$p = 0.002$
Two Fragments	12.69	
Three Fragments	3.36	
Four Fragments	6.05	

Table 1: CE symmetry significantly differed with additional bone fragments and was greatest with three total fragments ($p < 0.05$).

- Mean time to postoperative facial photograph assessment was 36.2 months.
- Location of mandible resection including angle-to-parasymphysis, body-to-condyle, and hemi-mandibulectomy were not associated with significant symmetrical outcomes.
- Age, smoking status and the presence of at least 1 medical comorbidity were not significantly associated with postoperative facial symmetry.

Conclusion

- Optimization of post-operative symmetry following mandibular reconstruction using fibula free tissue transfer is largely independent of age, smoking status, comorbidities, and location of defect.
- The number of fibula bone fragments should be a point of consideration in preoperative planning, particularly for oral commissure aesthetic outcomes.

References

1. Hidalgo DA. Fibula free flap: a new method of mandible reconstruction. *Plast Reconstr Surg.* 1989;84(1):71-79.
2. Zavala A, Ore JF, Broggi A, De Pawlikowski W. Pediatric Mandibular Reconstruction Using the Vascularized Fibula Free Flap: Functional Outcomes in 34 Consecutive Patients. *Ann Plast Surg.* 2021;87(6):662-668.
3. Santamaria E, Galaso-Trujillo JR, Palafox D, et al. Donor-Site Morbidity Following Free Fibula Flap Harvest for Mandibular or Maxillary Reconstruction in Pediatric Patients. *J Craniofac Surg.* 2021;32(5):e464-e468.
4. Datarakar AN, Daware S, Kothe S, Oren P, Eitan M. Simultaneous Placement of Endosseous Implants in Free Fibula Flap for Reconstruction of Mandibular Resection Defects. *J Craniofac Surg.* 2020;31(5):e483-e485.
5. Bouland C, Albert N, Boutremans E, et al. Risk factors assessment in fibular free flap mandibular reconstruction. *Ann Chir Plast Esthet.* 2021;66(5):351-356.

Contact

Sruti Tekumalla
TJU Department of Otolaryngology
Sruti.tekumalla@Jefferson.edu