

The World's First Successful Combined Partial Face and Eye Transplant



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BACKGROUND

- Whole eye transplantation (WET) never previously successfully performed in human
- Historically deemed technically not feasible due to lack of microsurgical techniques and modern understanding of immunosuppression
- Optimization of microsurgical vascular anastomosis in animal models and anatomic studies in human cadavers paved path to developing vascular anastomosis critical to feasibility of human WET
- Advances in face transplantation (FT) coincide with improved understanding of immunologic processes and rejection, affording the opportunity to revisit WET

METHODS

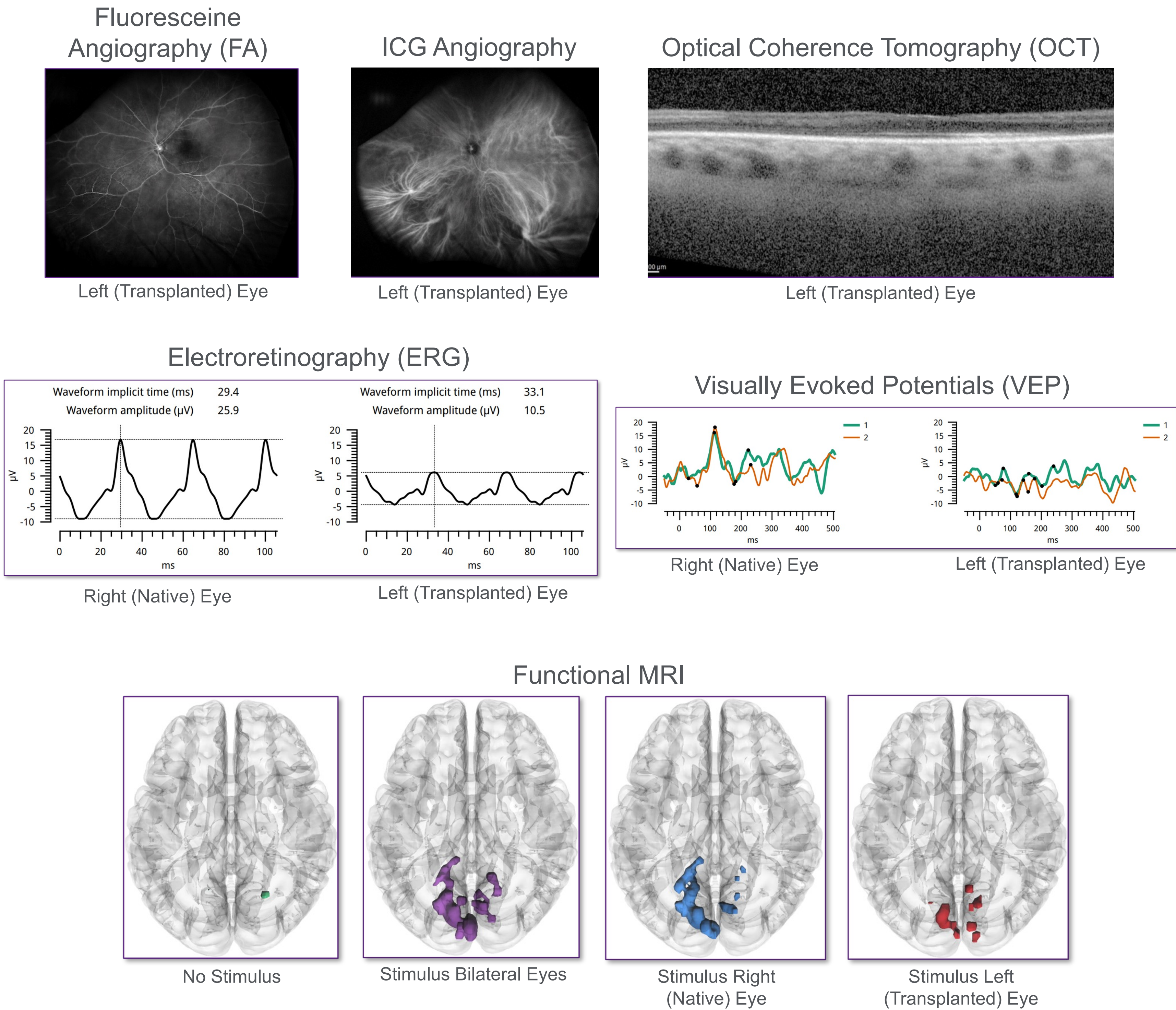
- Recipient: 46yo male with severe facial injury and functional deficits**
- Electrical burn injury to face, left orbit, left upper extremity during an accidental work-related high-voltage electrocution accident in June 2021
 - Initial injury and burn management included numerous surgical procedures including burn excisions, skin grafting, free tissue transfer, left eye enucleation, and a left upper extremity amputation
 - Severe functional deficits: sight, breathing, eating, speaking
- Donor: 31yo ABO identical brain-dead donor**
- Donor transferred to NYU Langone Health for multivisceral and VCA donation.
 - Transplant of the partial face, including nose, ears, lips/mouth, cheeks, left orbit and left whole eye performed in a 21-hour operation.



PRE-OPERATIVE INJURIES



IMAGES OF TRANSPLANTED EYE



RESULTS

- Transplanted eye with near physiologic rate to full retinal perfusion on FA noted on POD 45 onwards
- Transplanted eye with robust and physiologic choroidal perfusion on ICG angiography
- OCT demonstrates attenuated, yet present, retinal layers
- ERG of transplanted eye with dampened amplitude and organized waveform indicating attenuated retinal response and function, consistent with OCT findings
- VEP of transplanted eye cannot be differentiated from background noise
- fMRI shows mild activation in the visual cortex with isolated stimulation of transplanted eye on POD 148

CONCLUSIONS

- >10 months post op, with no acute rejection episodes
- Functional independence in ADLs, including eating and improved breathing
- Transplanted eye well perfused, with viable and functioning retina, physiologic IOP, healthy cornea without epithelialization, no inflammation
- No perceived vision reported to date, though ERG with response and visual cortical activation on fMRI
- No infectious complications to date
- WET is technically feasible in humans and can result in viable and functional globe and retina

