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Whole eye transplantation: are we on the cusp of an inflection point?

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Abstract

Traumatic facial injury and resultant eye enucleation remains a devastating life-changing event for many. With advancements in surgical techniques and immunosuppressive therapies, facial transplantation has been made viable. However, whole-eye transplantation (WET) has remained a distant goal until recently. Our aim was to review the existing literature on WET and assess current hurdles for its success. We identified pertinent keywords by conducting an initial literature exploration which was subsequently used to search scientific databases, including PubMed, Medline, and Embase. In line with the narrative methodology employed in this article, specific inclusion and exclusion criteria were not explicitly defined. The review focused exclusively on articles relating to ocular restoration and reconstructive surgery.

Though vision restoration remains elusive, burgeoning surgical techniques such as vascularised composite allotransplantation have opened the scope for surgeons to consider WET when planning facial transplants. Dr. Rodriguez and the NYU Langone team's transplantation has remained viable at 10 months. Though it has not facilitated visual restoration, it supports the potential of CD34-positive stem cells as neuroprotective agents when injected at the optic nerve connection of the recipient. Nevertheless, it is also crucial to deliberate on ethical considerations such as the lifelong implications associated with immunosuppression and, challenges related to the equitable division of ocular tissue for WET versus keratoplasty. WET amid significant facial trauma has great potential to restore the quality of life in patients through improved cosmesis. Further research is required to demonstrate its long-term viability and potential for vision-restoration in humans.

Keywords: eye transplantation; traumatic facial injury; surgical advancement; cosmetic surgery