3D-PRINTED KERATOPROSTHESIS FOR SEVERE TO END-STAGE CORNEAL BLINDNESS

TECHNOLOGY OVERVIEW

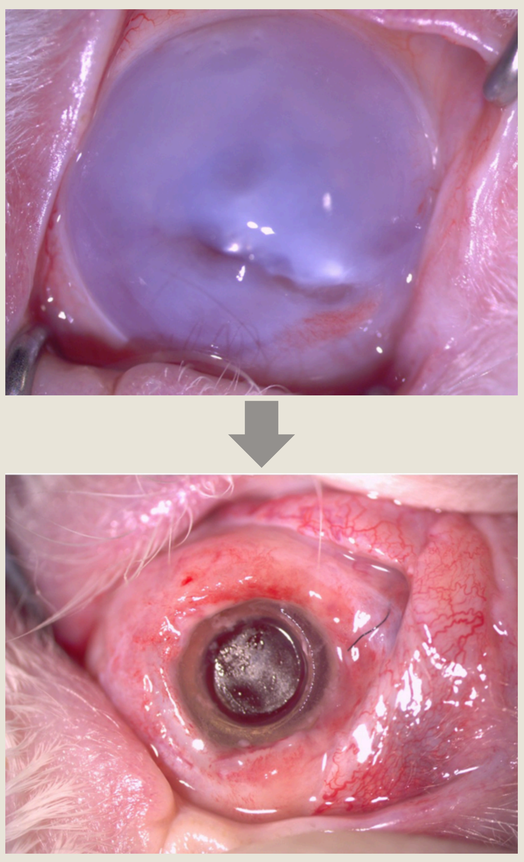
This project involves the development of a synthetic keratoprosthesis featuring a 3D-printed titanium skirt and a medical-grade transparent optic. This technology targets a critical gap in treating severe to end-stage corneal blindness — where patients are no longer eligible for conventional corneal transplants due to repeated graft failures or severe ocular surface disease. This innovation presents a clinically-informed, engineering-driven solution to one of the most challenging forms of blindness, with the potential to advance toward translational and global impact.

COLLABORATORS

NAMIC SG
NATIONAL ADDITIVE MANUFACTURING INNOVATION CLUSTER

SINGAPORE EYE RESEARCH INSTITUTE

Singapore National Eye Centre
SingHealth



TECHNICAL SPECIFICATIONS

The 3D-printed keratoprosthesis is a fully synthetic, two-part implant system consisting of:

- A titanuim skirt fabricated using medical grade titanium alloy
- A structure that enhances tissue integration and long-term stability within the ocular environment
- A secure interlocked interface with the central optic

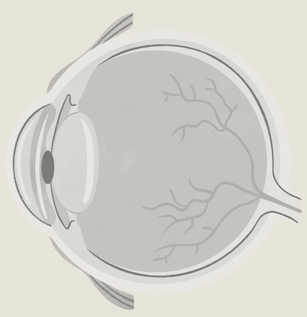
The prosthetic's key advantages include:

- Delivering over 70% weight reduction compared to traditional prosthetic devices
- Enabling high clarity and optical stability
- Maintaining long-term optical performance under physiological conditions.

UNIQUE VALUE PROPOSITION

This design offers a non-biological, readily manufacturable alternative to the traditional osteo-odonto-keratoprosthesis (OOKP).
The design also contributes to:

- Reducing the total procedure time from 3–4 months to just 3–4 hours
- Achieving up to 40% healthcare cost savings by eliminating the need for a dental surgeon
- Minimizing surgical morbidity



CUSTOMER BENEFITS

- Reduced surgical complexity resulting in shorter surgery time, fewer complications, and faster recovery
- Improved patient comfort due to decreased strain on the ocular surface
- Increased accessibility due to an estimated 40% cost saving

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