

Modified Osteo-Odonto Keratoprosthesis (MOOKP)

A project initiated by SSM Eye Research Foundation (a not-for-profit charitable trust)

Purpose:

Purpose of the foundation is to generate funds to create the infrastructure for performing this complex procedure which is done in multiple stages over a period of months and years and it is primarily done for people who become blind due to loss of integrity to the outer portion of the eyeball. Therefore the eye becomes an opaque organ where the functional capacity is still intact because the internal structures are still normal whereas the external services which is like a glass which transmits lights and images into the eye becomes opaque.

MOOKP (also known as “tooth in eye” surgery) is a complex surgical procedure to restore vision in bilaterally blind people.

What is a Keratoprosthesis?

Keratoprosthesis is a surgical procedure where the diseased cornea is replaced with an artificial cornea. Any synthetic/artificial material implanted in the body is highly likely to get expelled/extruded, and keratoprosthesis also carries this risk. But MOOKP has stood the test of time with a 10-year survival of more than 65%.

What is MOOKP?

Osteo-Odonto Keratoprosthesis, developed by Italian ophthalmologist Prof. Strampelli, was modified, perfected and popularised by Prof. G. Flacinelli. Termed as Modified Osteo-Odonto Keratoprosthesis (MOOKP), this is the most successful of all keratoprosthesis surgeries performed today.

MOOKP is a complex and laborious multidisciplinary procedure that involves fixing a synthetic lens (called optic cylinder) into a tooth harvested from a patient and transplanting it onto the eye of the same patient.

MOOKP is performed in three stages spread over a period of 6 months.

First stage (Stage Ia): This stage is a preparatory stage wherein the health of the retina and the optic nerve is assessed, and a decision to continue the MOOKP surgery in a particular patient is taken. The surgical time for this stage is about 2 hours.

Second stage (Stage Ib + Ic): This stage is done 1 to 2 months after the first stage. The damaged ocular surface is replaced with buccal mucus membrane (taken from the cheek).

Along with it, one tooth (usually canine) with its supporting bone is removed. The tooth is then fashioned into a thin plate (lamina), and a synthetic optic cylinder is fixed into it. The lamina is implanted in a pouch created under the skin to prime it before transplanting it to the eye. The surgical time for this stage is about 6 to 8 hours.

Third stage (Stage II): The third stage of MOOKP is performed 2 to 3 months after the second stage. The lamina is removed from the pouch and implanted under the buccal mucosal graft, with which the damaged ocular surface was replaced in the second stage. One end of the optic cylinder is exposed to the exterior through the buccal mucosa and the other end in the eye. The optic cylinder facilitates the unhindered passage of light rays into the eye and accurately focuses images on the retina. It takes about 4 to 5 hours to complete this stage.

Who benefits from MOOKP?

MOOKP is a procedure reserved for patients with extensive damage to the cornea and surface of the eye. Usually, when the cornea is damaged, the treatment choice is a corneal transplant. But when there is associated extensive damage of the ocular surface, any form of corneal transplant is bound to fail. The only option in these cases is a prosthetic device. Of all the prosthetic devices available to replace cornea (keratoprosthesis), MOOKP has the highest success rate with minimal chances of extrusion and other complications.

The most common indications for MOOKP in India are Stevens-Johnson Syndrome (SJS) and Chemical injuries of the eye. The former is a form of a severe allergic reaction to medication or some viral or other infections. Once the acute event settles, permanent damage to both eyes occurs, resulting in blindness. On the other hand, chemical injuries can result from accidents, usually industrial, assault (vitriolage), resulting in irreversible damage to the cornea and ocular surface, causing bilateral blindness. The only option available to restore vision in this group of patients is MOOKP.

Why should we start MOOKP through SSM Eye Research Foundation?

Giridhar Eye Institute (GEI), the parent hospital through which the Foundation's activities are conducted and Giridhar Eye Institute being a tertiary eye care centre, patients with severe ocular problems get referred to GEI from all over the state. In India, only four centres (two in Chennai and one each in New Delhi and Bangalore) actively provide this procedure to the needy. There is a need to have this facility in more centres across our country to serve the needy.

One of the significant hurdles in setting up a unit for MOOKP is the requirement of a multidisciplinary team. Cornea specialists with support from Oculoplasty, Glaucoma and Retina colleagues comprise the ophthalmology team. In addition, an excellent anaesthesia team is critical due to the long duration of each stage of MOOKP. A well-equipped

ophthalmology operation theatre with some machines and instruments specific for MOOKP is another hurdle in setting up a MOOKP unit.

Giridhar Eye Institute has well-established departments in all subspecialties of ophthalmology and the most modern ophthalmic operation theatre. The team for running the MOOKP program is already in place, and little addition to the infrastructure in terms of machines and instrumentation are required before the MOOKP program can begin.

The actual beneficiaries of the MOOKP program are people who become blind in both eyes due to conditions like SJS, chemical injuries, etc. These conditions are seen mainly in young adults at the prime of their life. The majority of these people are in the lower socioeconomic group. And many of them are the sole breadwinners in the family. In many, the burden treatment for the acute event drains the meagre resources they have. And after surviving the acute phase, which results in blindness in both eyes, they are reduced from being the provider to the family to being dependent on others. The only hope for the restoration of vision in this unfortunate group of patients is MOOKP, which can bring about a significant positive change in their and the family's life. Since successful surgery in these patients can return them to near normal life, starting the MOOKP program anywhere has to be a 'not for profit' initiative. It is in this effort that we seek support/aid in setting up the unit.

Budget:

MOOKP requires machines and instruments specifically for this procedure. Below mentioned is the rough list of the major machines/instruments to be procured for MOOKP. This is over and above the facilities/instruments we already have at our disposal in GEI's operation theatre.

| S.No. | Equipment/Instrument | Estimated cost (INR) |
|--------------|---|-----------------------------|
| 1 | Stryker Drill with attachments and blades | 22,00,000.00 |
| 2 | Drill bits (to be imported from Brussels) | 50,000.00 |
| 3 | Overhead light | 3,00,000.00 |
| 4 | Surgical instruments (dental drill, RF cautery etc.) | 6,00,000.00 |
| 5 | Anaesthesia equipment (monitors, patient warmer, fluid warmer etc.) | 7,00,000.00 |
| | Total Budget | 38,50,000.00 |
