Simplified treatment for a cause of sight loss offers savings for hospitals and relief for patients

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Simplifying a surgical technique to treat one of the important causes of sight loss around the world could deliver major savings for eye hospitals and help bring the treatment to more patients, according to new research.

The method, developed by Professor Sheila MacNeil, a tissue engineer at the University of Sheffield, and Dr. Virender Sangwan, an ophthalmic surgeon at L V Prasad Eye Institute in Hyderabad, India, offers a different way of using stem cell therapy to treat damaged epithelial cells which protect the cornea.

First developed in 2012 for patients in India, the method has now become routine practice in this country and has had a profound impact on the treatment of eyes damaged by accident or disease. However, despite its success, the procedure is yet to be adopted more widely by surgeons in other countries.

Now, a new paper in the *British Journal of Ophthalmology* has revealed that as well as being as effective as the technique currently used by eye surgeons in other countries, the procedure is also only 10 percent the cost.

Currently patients outside of India with damaged epithelial cells can only be treated in specialist centers. Here, cells from the unaffected eye are cultured over several weeks in specialist laboratories and grafted back to the scarred eye using a human amniotic membrane—derived from donated placenta—to deliver them.

While the success with this technique is good, there are thought to be approximately 12 centers in the world offering this technology to patients. In terms of accessibility, there is only one company in Europe able to offer this procedure on a commercial basis.

The procedure developed by researchers in Sheffield and India is much simpler with one modification to the existing technique. It uses tiny pieces of tissue taken from the unaffected eye to regrow a new cornea epithelium on the damaged eye—rather than culturing the patient's corneal cells in a specialist laboratory over several weeks.

Essentially the simplified technique uses the patient's own body as the incubator for the expansion of stem cells found in small pieces of the limbus placed on amniotic membrane on the damaged eye. Cells migrate out of the limbal pieces and join up to form a new corneal epithelium over several weeks.

The effectiveness of the procedure has been well documented in over 30 peer-reviewed studies, as summarized in the *British Journal of Ophthalmology*, and for the first time the authors

looked at the health economics of the simplified technique versus the original technique.

The technique has been found to be just as effective at treating patients with damaged epithelial cells as the current method used by eye surgeons over the last two decades and found to be even more effective when treating children.

More information: Praveen Thokala et al. Economic, clinical and social impact of simple limbal epithelial transplantation for limbal stem cell deficiency, *British Journal of Ophthalmology* (2021). DOI: 10.1136/bjophthalmol-2020-318642

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