

Corneal Transplants

Eye surgeons cannot yet transplant the whole eye but 90% of corneal transplants are successful, thanks to modern medical advances—By Sir Benjamin Rycroft

► SINCE 1905 the corneal graft operation has been practiced successfully in many parts of the world, and has restored sight to many patients who hitherto had been considered hopelessly blind because of an opaque corneal scar.

As yet, eye surgeons cannot transplant the whole eye, though many attempts have been made (those of the American surgeon, C. H. May in 1886 are remembered), but all attempts have hitherto failed. Yet, when a part of the eye, the cornea, is transplanted 90% of these transplants are successful.

The reason for this sharp difference in the behavior of the whole eye and the cornea is that there are no blood vessels in the cornea and, therefore, tissue antagonism is not provoked, whereas if the whole eye is grafted the blood vessels of the grafted eye and the recipient cause hostile tissue responses and rejection of the graft.

In addition to the cornea, pieces of the protective coat of the eye ball, the sclera, are readily transplanted with success; so also is the jelly which fills the eyeball—the vitreous humor. Neither of these structures has blood vessels. It is the presence of blood vessels which still defeats total eye transplants.

Therefore, attention has again turned to the use of inert materials to circumvent tissue reactions and, as has been seen, this is not a new idea but one that dates from the end of the 18th century.

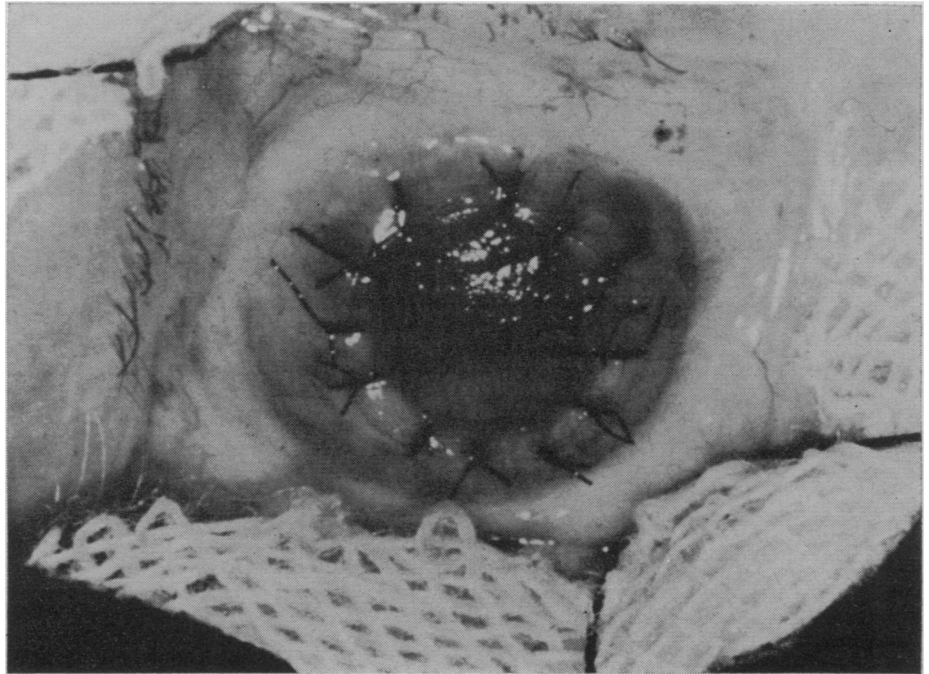
Recently the insertion of plastic lenses in the cornea has been tried. For a few months they appear to be successful. Eventually, however, they are extruded, since there is no firm union between the plastic material and the tissues. Another complication is the growth of membranes which obscure and bury the plastic implant.

Tooth Tissue Used

Dr. Benedetto Strampelli of Rome conceived the idea of fixing the plastic implant in a ring of the patient's own tissue, from one of his teeth. The tooth ring heals into the cornea and the plastic implant is thus held in place. Certainly early results with this technique are promising.

If blindness is caused by an opaque scar on the cornea, or window, of the eye, it is necessary to remove the scar and replace it by transparent material if the patient is to see again.

The experience of a century of



British Information Service

PLASTIC GRAFT—Part of the patient's own tooth tissue is used as a base for a plastic lens in the corneal graft sewn onto the eye.

trials has shown that the replacement must come from another individual of the same species if it is to remain clear. For example, in man the transparent graft must come from another man; if it is taken from an animal the graft may or may not be accepted and heal in place, but it will certainly not remain clear. It is not just a case of getting the graft to heal, since this will happen even with dead material; it is essential that the graft remain alive and permanently clear.

In exceptional circumstances, the other eye of the same patient may produce the graft, but such a happy combination of events is rare; when it does occur, however, such cases always succeed since there is no possibility of adverse tissue reactions.

The modern corneal grafts vary in size from four to 10 millimeters. In the early days of pioneer technique the grafts were small, since they gave rise to fewer complications, but in recent years the size has been increased with safety and much advantage to the patient.

Modern instruments are superb. A graft is cut with a sharp trephine of suitable diameter, and fixed in place with silk of two-fiber thickness. Such

silk is inserted on a four-mm needle of exquisite manufacture, and 12 to 16 minute stitches fix the corneal graft securely in place. The operation is usually performed under general anesthesia and takes about 40 minutes.

Few Complications

Complications are few if the operation is performed by skilled surgeons. The menace of infection has been almost obliterated by the use of modern antibiotics and a careful laboratory screen of the patient before operation.

The major problems which remain lie in the realm of biology, and include the invasion of grafts by new blood vessels, and by fluid from the interior of the eye. Nevertheless, the use of cortico-steroids and beta radiation have become valuable controls against these unwanted blood vessels. Fluid invasion, or edema, of the corneal graft, remains the most important area for research.

It has been stated that for a human corneal transplantation the graft must be taken from a human being. At East Grinstead, the Regional Eye Bank has been at work for 15 years, responsible for the collection of donor eyes,

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their documentation and subsequent distribution to surgeons who require them for corneal graft operations.

Such eyes are bequeathed or provided by consent of the nearest relative, under the Human Tissues Act of 1962. A special van equipped with surgical, bacteriological and storage facilities is available to visit homes and hospitals, in order to collect eye bequests, and in this way much material is taken to the Eye Bank as speedily as possible. In 1965 more than 200 eyes were obtained in this way, 30% from domestic bequests.

The results of corneal graft surgery have continued to improve with increased skill, experience and the use of fresh donor material.

Yet, in severe burns a living graft will certainly heal in place, but it will not remain clear and is, therefore, useless to the patient. This is why the idea of Dr. Strampelli to implant a plastic lens in an autograft of tooth tissue is so full of promise for those desperate cases which, hitherto, have always failed to maintain the transparency of a living graft.

Success Depends on Scars

It may be said that the average success of corneal grafts depends on the type of scars from which the operation was carried out. For example, for distortion, such as conical cornea, the rate of success—meaning a clear graft and good vision—is about 95%. In the usual type of corneal scar the rate is about 70%. But in scars from metal burns or from lime, it remains at 10% to 15%—with the hope, however, that if the new plastic graft is used this percentage will surely rise.

Thin, or lamellar grafts, are playing an increasing part in the treatment of acute eye diseases such as resistant ulcers, and the future will see a great expansion in their use for therapeutic, as well as for optical, purposes.

Thus, in our time, has come the defeat of another example of blindness, that due to corneal scars, and so the causes of blindness are being gradually eliminated. The modern surgery of retinal detachment marches alongside the surgery of corneal grafts and uses such advanced techniques as the laser beam to spotweld the retina, and vitreous transplantation to restore the volume of the eyeball. Silicone products are under intensive research as replacement material both in retinal and corneal graft surgery.

Also, cancer of the retina, or retino-blastoma, is being attacked successfully by the laser beam which will obliterate small growths, or by the cobalt application which is used for more extensive invasion.

Sir Benjamin Rycroft is clinical director of the Rockington Eye Transplantation Unit, Royal College of Surgeons of England.

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Agronomia. — Scientistas del Universitate Connecticut ha disveloppate pro gallinas un special dieta a deficientia (i.e., a contento subnormal del amino-acido lysina) le qual resulta durante le prime octo septimanas del vita del aves in un relentamento de lor crescentia per quasi 50 pro cento e retarda lor maturitate per tres septimanas. Le objectivo? Gallinas assi alimentate pone plus numerose grande e minus numerose micre ovos.

Cholera. — Iste morbo, regardate usque satis recentemente como "conquerite" per le scientia medical, ha comenciate redevenir un menacia in multe areas del mundo ubi le population es dense e le sanitation inadequate. Le decennio passate ha vidite un augmento in le numero del subjectos afficite e etiam in le extension geographic del infection. Ha etiam occurrite un resurgentia del interesse in recercas scientific relative al tractamento e al prevention de cholera. In un recente colloquio al statounitese Institutos National de Salute, importante progressos de data recente esseva revistate per investigadores le quales haveva participate in ille disveloppamentos. Disturbationes de fluido e electrolytos in cholera clinic explica le mortalitate associate con le condition, sed istos es factores que pote esser manipulate si satisfactorimente que omne patiente deberea superviver si ille recipe un appropriate attention therapeutic. Per medio de antibioticos, le duration del morbo se reduce al minimo. Studios bacteriologic promitte revelar le substantia toxic per medio del qual le vibron de cholera induce diarrhea. Le valor del immunisation prophylactic contra cholera, previemente acceptate sin stricte prova, ha recentemente es-site demonstrate in un essayage a controllo. Ben que vaccino contra cholera in su presente constitution pote reducir le incidentia de cholera clinic per approximativamente 80 pro cento, illo causa adverse effectos secundari, protege probabilemente solo durante un restringite periodo de tempore, e es forsan sin valor in eliminar le stato de vector. Pro eradicar cholera, recercas additional e meliorationes technologic va esser requirite, particularmente quanto al methodos de prevention.

Sociologia de Morbo Cardiac. — Subjectos con morbo cardiac (como gruppo total) differe de maniera statisticamente significative ab comparabile subjectos sin morbo cardiac in tanto que in lor familias le discrepantia educational inter marito e marita e inter illes mesme e lor parentes es plus marcate. Isto es un del conclusiones tentative supportate per le datos colligite in le Projecto de Recercas Neurocardiologic del Universitate Oklahoma. Negativamente, le datos non reflecte ulle correlation inter morbo cardiac e quotiente de intelligentia o classe social.

Statistica Economic. — In 1965, alimentos in le Statos Unite absorbeva 18 pro cento del "disponibile" revenitos del population. In 1933, le correspondente proportion esseva 24 pro cento.

Technologia Medical. — Decisiones diagnostic e therapeutic se basa frequentissimamente in le resultados de tests laboratorial. Un alte procentage de tal tests es executate per laboratorios commercial. In un studio reportate in le Journal American del Scientias Medical, le fidelitate del datos reportate per sex commercial laboratorios clinic, omnes de bon reputation, esseva testate per le procuration ab illos, durante plure septimanas, de reportos de essayage chimic e hematologic concernente specimens a characteristics previemente cognoscite. Le studio revelava un disaccordo disquietante inter le reportos de plures del laboratorios. Solmente duo del sex laborava intra acceptabile margines de deviation quanto al accuratia e precision de lor reportos.

Vaccinos. — Reportos ab le statounitese Institutos National de Salute pare promitter que in pauc annos un vaccino de vive virus attenuate va esser disponibile contra rubella.

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