EYE BANK

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OVERVIEW

- INTRODUCTION
- FUNCTIONS
- CONTRAINDICATIONS
- STEPS OF EYE DONATION
- RATING OF CORNEA
- STORAGE
- DISTRIBUTION
- CORNEAL TRANSPLANTATION
- LEGAL ASPECTS IN INDIA

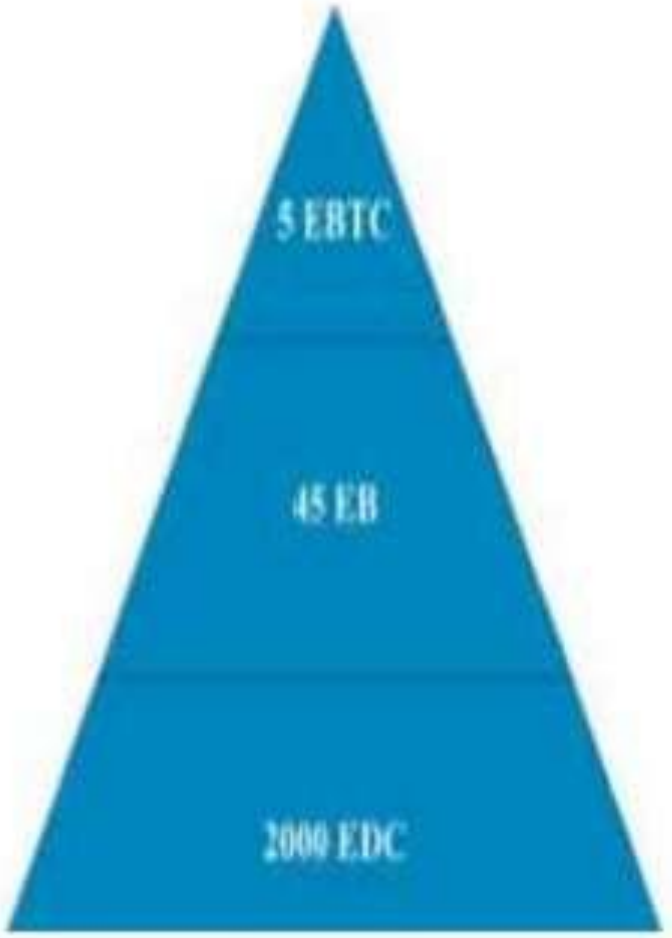
What is an Eye Bank ?

It is a non profit community organization which deals with the collection , storage , & distribution of cornea for the purpose of corneal grafting , research & supply of the other eye tissues for the other purposes.

THREE TIER ORGANIZATION

An integrated system involving a three-tier community eye banking pyramid based on the infrastructure and manpower at all levels

- The three tiers proposed were eye donation centres, eye bank and eye bank training centres.



EBTC (EYE BANK TRAINING CENTRE)

- The top tier comprises of 5 Eye banking training centers (EBTC)
- responsible for

1. Tissue harvesting, processing & distribution.
2. Creating public awareness.
3. Training and skill up-gradation of eye banking personnel.

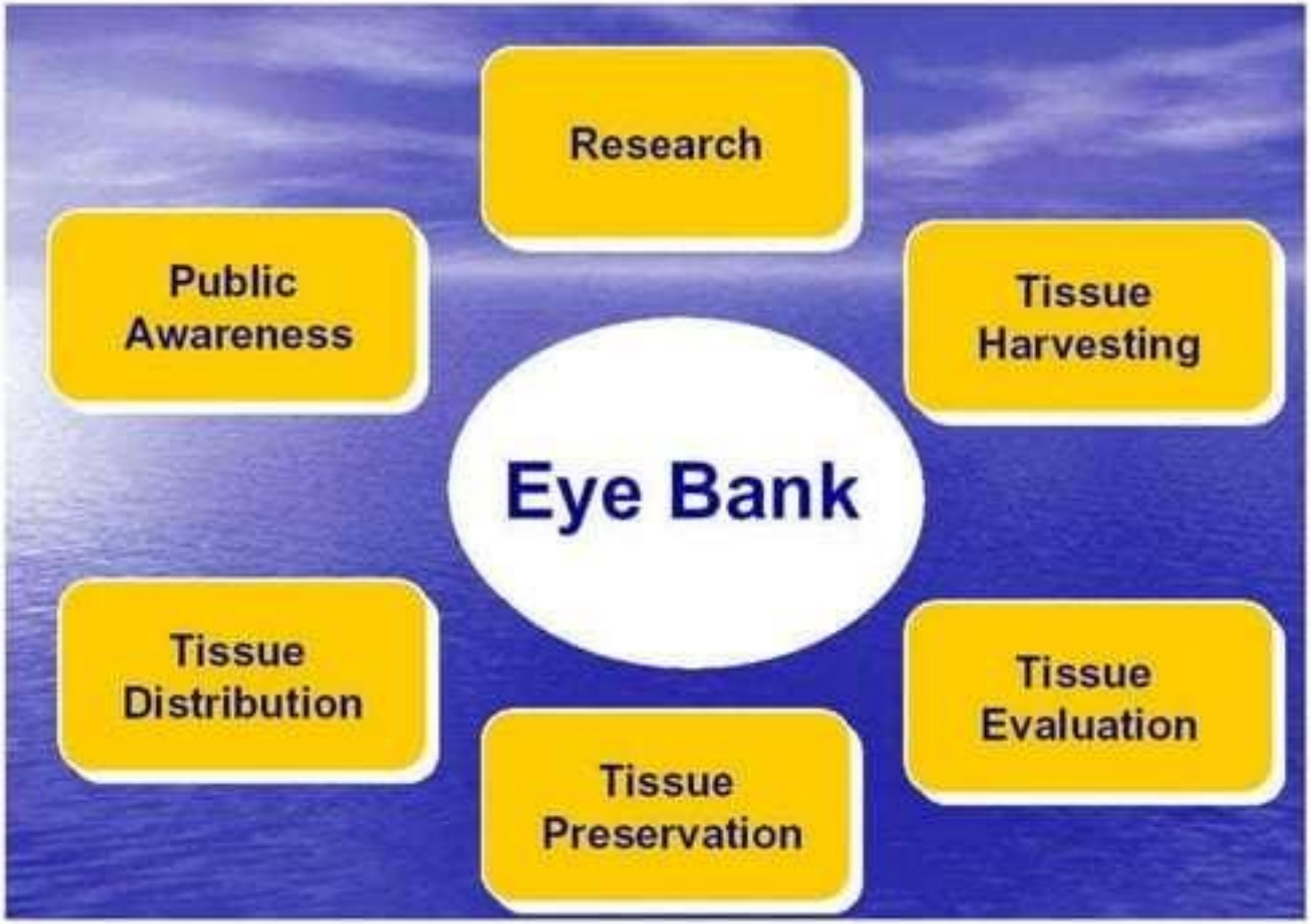
EYE BANKS

- Middle tier would comprise of a strong network of 45 Eye Banks(EB)
- cater to a population of 20 million each.
- would be closely linked with 2,000 Eye Donation Centers- EDC (ratio of 1: 50 suggested)

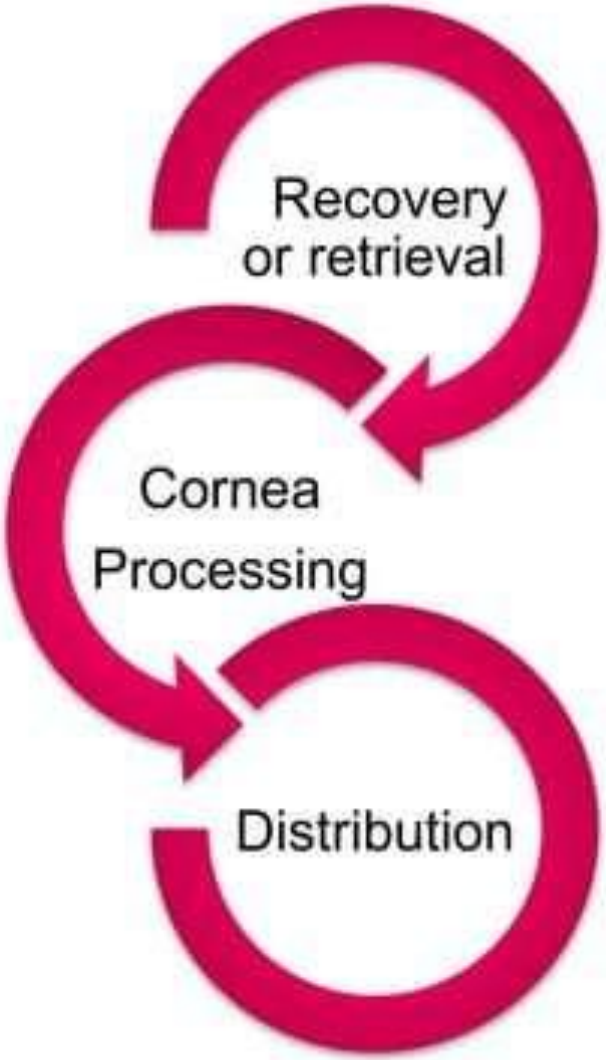
EYE DONATION CENTERS

- Publicity of the volantary donation
- Registration
- Arrangement for the collection of the eye after death
- Processing , packing , & transportation of collected eye to attached eye bank
- would cater to a population ranging from 50,000 to 100,000.

FUNCTIONS OF EYE BANK



How It Works ?



Tissue Retrieval

- Contraindications:

Systemic:

- AIDS
- Rabies
- Active viral hepatitis
- Creutzfeldt-Jakob disease
- SSPE
- Death from unknown causes
- Congenital Rubella
- Active septicemia
- High risk behavioral features
- Leukemia (blast form)
- Lymphoma/ lymphosarcoma

Ocular:

- Intrinsic eye diseases
- ✓ Retinoblastoma
- ✓ Active conjunctivitis , iritis , uveitis , vitreitis, retinitis
- ✓ Congenital abnormalities (keratoconus)
- ✓ Central opacities, pterygeum
- Prior refractive procedures (radial keratotomy scar, lamellar inserts)

STEPS OF EYE DONATION

1. Donor selection
2. Tissue retrieval
3. Corneal examination
4. Tissue transportation
5. Storage of corneal tissue
6. Distribution

DONOR SELECTION

1) AGE OF DONOR:

no influence of age on transplant outcome.

Older age : usage rate declines

Lower limit : 2 yrs to prevent myopic shift after keratoplasty

2) MEDICAL HISTORY REVIEW

- Eye banks must have consistent policies for the examination and documentation of donor's available
- medical records,
- medical history
- cause of death
- Medications
- laboratory reports

TISSUE RETRIVAL

enucleation

i.e. surgical
removal of the whole eye
scleral

is retained

by in -situ
corneo-

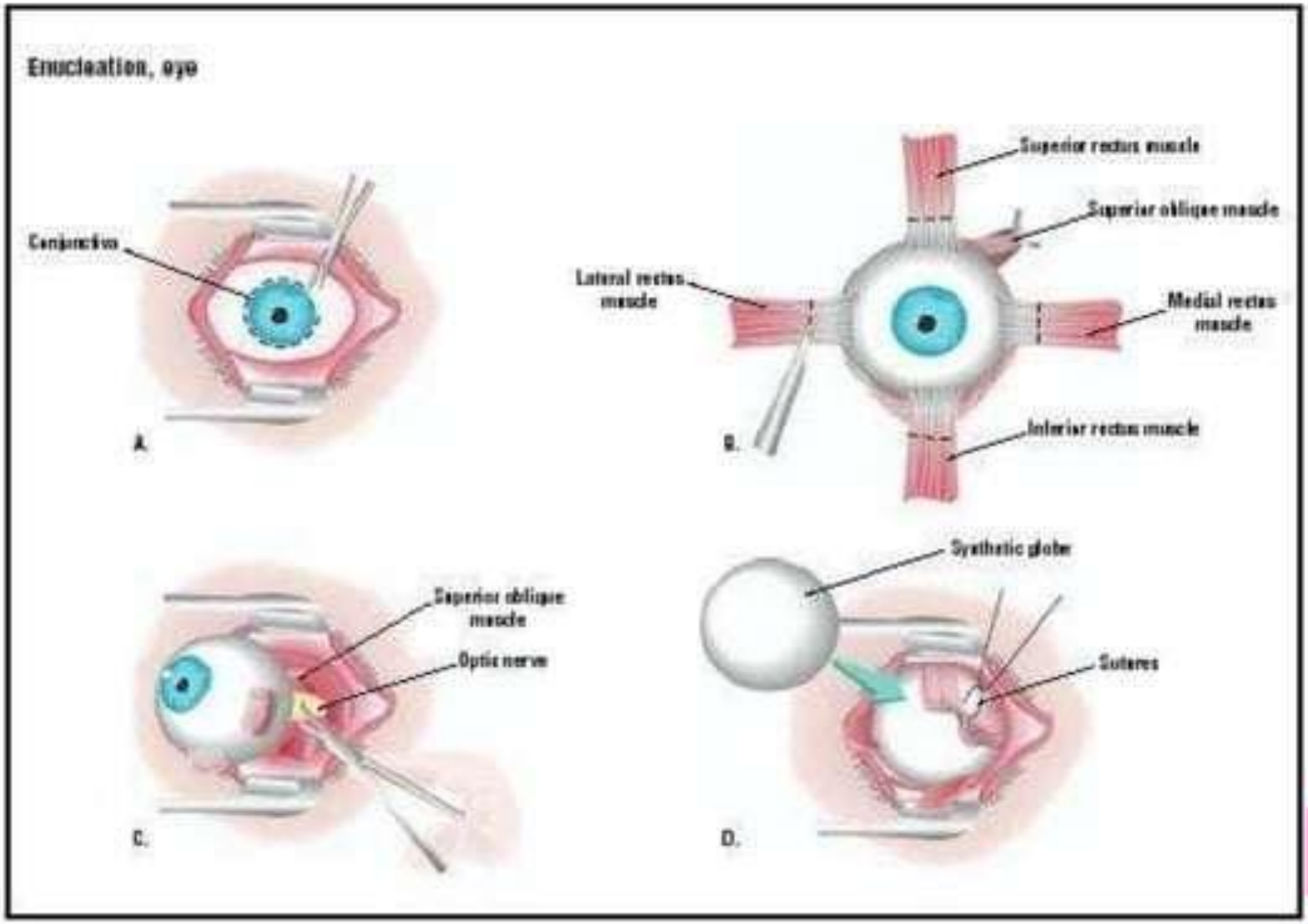
excision
(globe

In the orbit)

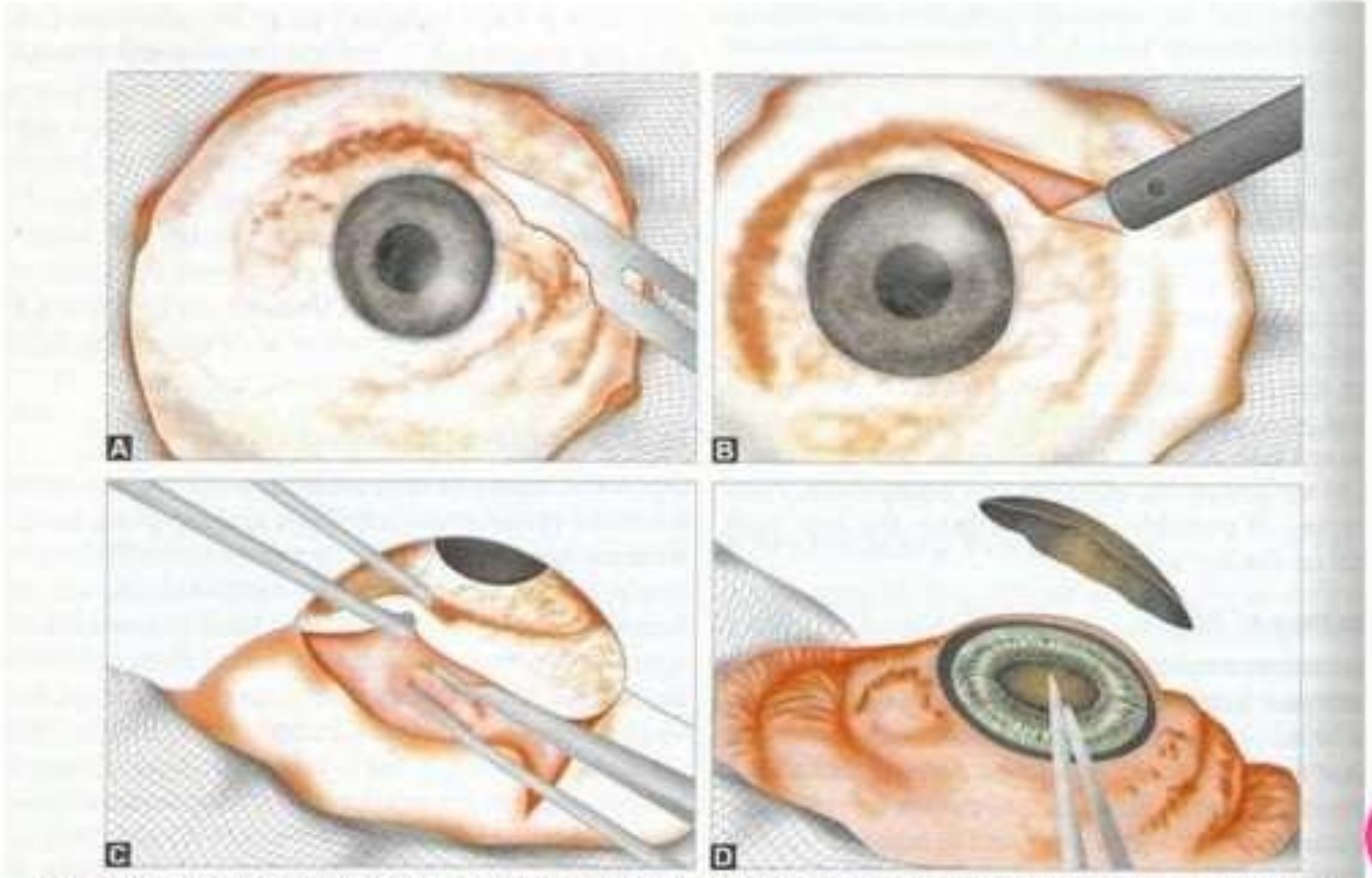
PRELIMINARY PREPARATIONS

- Obtain legal permission.
- Go through the donor's medical records for any contraindications.
- Wash hands and be prepared with aseptic dressing, draping etc.
- Identify the donor.
- Collection of postmortem blood:10ml
  - ✓ Femoral vein
  - ✓ Subclavian vein
  - ✓ Heart
  - ✓ Jugular vein

ENUCLEATION



CORNEOSCLERAL BUTTON EXCISION



Figs 32.2A to D: Corneoscleral button excision procedure. Scleral incision 4-5 mm in length at 2-3 mm behind limbus (A) is made, scleral incision is extended for 360 degrees (B), iris is pulled away from the cornea (C, D)

EVALUATION OF THE DONOR TISSUE

- Gross examinations:

✓ Whole globe:

eyes with excessive stromal hydration should be discarded unless specular microscopy can be done for endothelial cell count.

✓ Corneoscleral button:

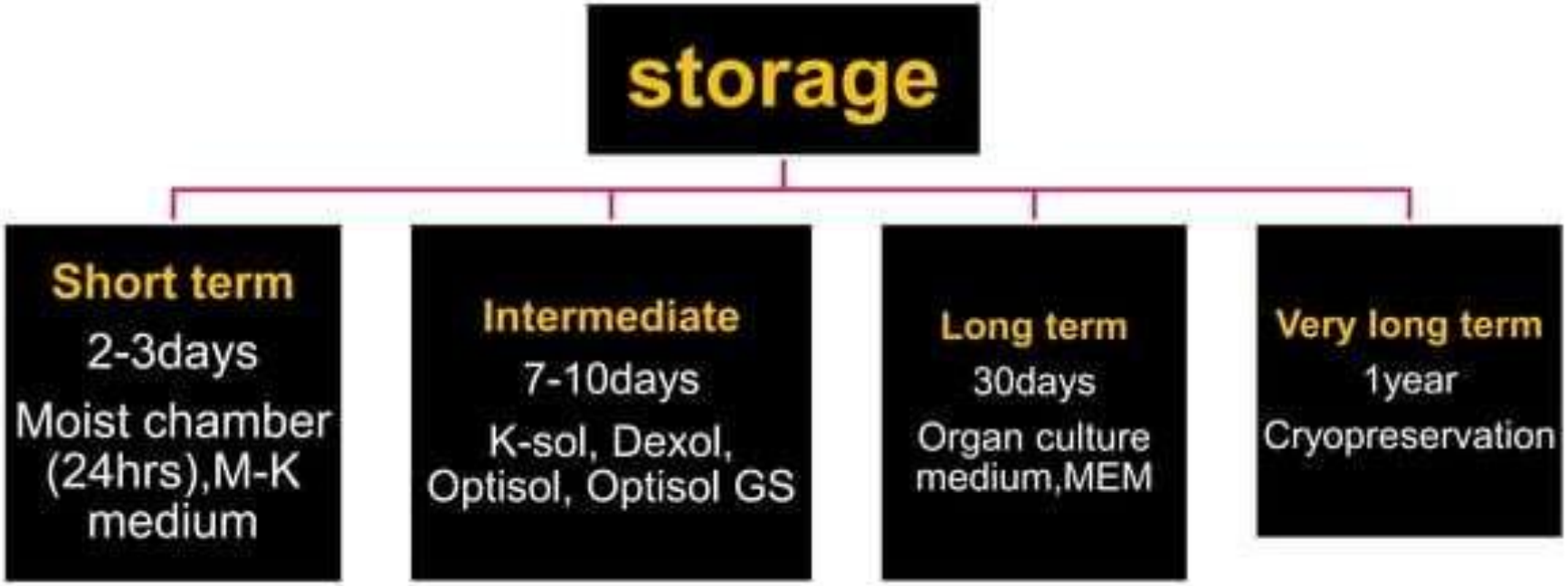
colour of the tissue storage media is to be noted. Yellowish colour-acidic media-contamination.

Evaluation of donor tissue

- Biomicroscopic examination:

Rate	criteria
1 (excellent)	1. No epithelial defects 2. Crystal clear stroma 3. No arcus senilis 4. No folds in descemet's membrane 5. Endotheleum-no defects
2 (very good)	1. Slight epitheal haze/defects 2. Clear stroma 3. Very slight arcus 4. Few folds in descemet 5. Endotheleum-no defects
3 (good)	1. Moderate epi. Defects 2. Moderate stromal cloudyness 3. Arcus < 2.5mm 4. Numerous but shallow folds 5. Few vacuolated cells in endotheleum
4 (fair)	1. Epitheleal defects > 60% 2. Mod to heavy stromal cloudiness 3. Numerous deep descemet's folds 4. Arcus > 2.5mm 5. Low endotheleal cell density
Poor	1. Central epitheleal defects 2. Heavy stromal cloudyness 3. Marked folds 4. Marked endotheleal cellular defects

STORAGE OF DONOR TISSUE



METHODS OF CORNEAL PRESERVATI0N

1. Short-term storage methods
2. Intermediate-term storage
3. Long term storage

Eye Bank - Preservation Media

- Short Term (48hrs) - Moist Chamber
- Intermediate Term (4 days) -
  - McCarey - Kaufman medium – 4 days
  - K - Sol medium - 7 days
  - Dexsol medium - 10 days
  - Optisol medium - 14 days
- Long term storage - Organ Culture – 35 days
  - Cryopreservation - 1 year

SHORT TERM STORAGE METHODS

1. Moist chamber storage:

- Storage of the whole globe for short period of time at 4 degree
- It is a closed container with cotton gauze moistened with sterile saline
- Container is never completely filled with liquid

Advantages of moist chamber storage

1.simplicity

2. needs little expertise & manipulation

3.inexpensive

Disadvantages

1.storage time limited to 48 hrs

2. endothelium remains in contact with aqueous.

INTERMEDIATE TERM STORAGE METHODS

Tissue media preservation:

- Advantages:

1.provides a chemically defined & stable environment

2.helps support & enhances metabolic activities

3.reduces the stromal swelling

4.keeps the tissue under sterile condition till use

5.provides time for EB to serologically screen the donor for communicable diseases

INGREDIENTS :

1. Dextran
2. Chondroitin sulphate
3. Electrolytes
4. pH buffer system
5. Antibiotics
6. Essential aminoacids
7. Antioxidants,ATP precursors
8. Insulin
9. EGF
10. ANTIPROTEASES & anticollagenases

Dextran

- Keeps preserved cornea thin
- Initially 5% of 5,00,000 mol wt dextran is used.
- In newer media 1% of 40000mol.Wt is used.

Chondroitin sulphate.

- it is akin to naturally occuring GAG in cornea.
- It is available from whale(type A),wine(typeB),shark(type c).
- High mol.wt chondroitin sulphate maintains deturegence where as low mol.wt helps retain viability of endothelium
- Also acts as an antioxidant

MC CAREY KAUFMAN MEDIUM

Components

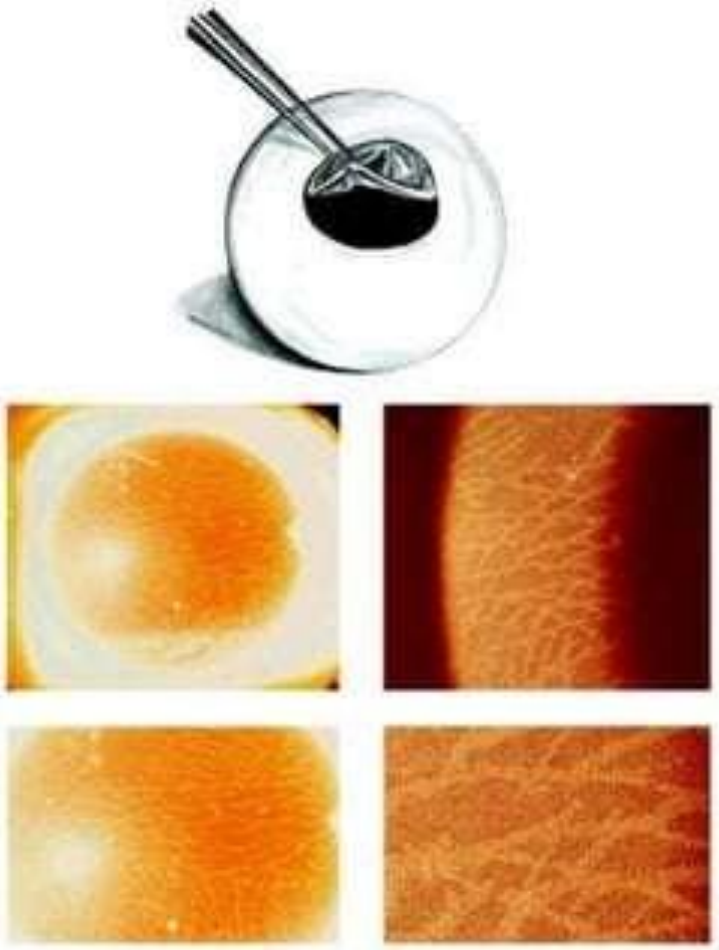
- Tic 199
- 5% dextran
- Bicarbonate buffer
- Penicillin and streptomycin which was later substituted by gentamycin in con of 50-200 micro grams per ml

Modified MK medium

- Waltman and plamberg
- Substituted 0.025 M hepes buffer for bicarbonate buffer
- phenol red as a pH indicator
- Osmolarity 290 milli osm/kg
- pH 7.4
- Storage period 4 days at 4 degree C.


Dhaka, Bang
Date:

Snail Tracks, Stress Striae Careless



- The middle and lower illustrations show snail tracks at varying degrees of magnification.
- Careless folding of the corneal cap during removal causes snail tracks .

Distribution of Cornea

- Distribution to only hospitals and ophthalmologists registered under HOTA
- Maintenance of waiting list
- Distribution record
- Feedback from the hospital receiving cornea

Other uses:

- Donated Sclera can be used for glaucoma , oculoplastic and retinal surgeries
- Human amniotic membrane can be used for ocular surface procedures
- Fair and equitable distribution of transplantable tissues to corneal surgeons acco to waiting list.

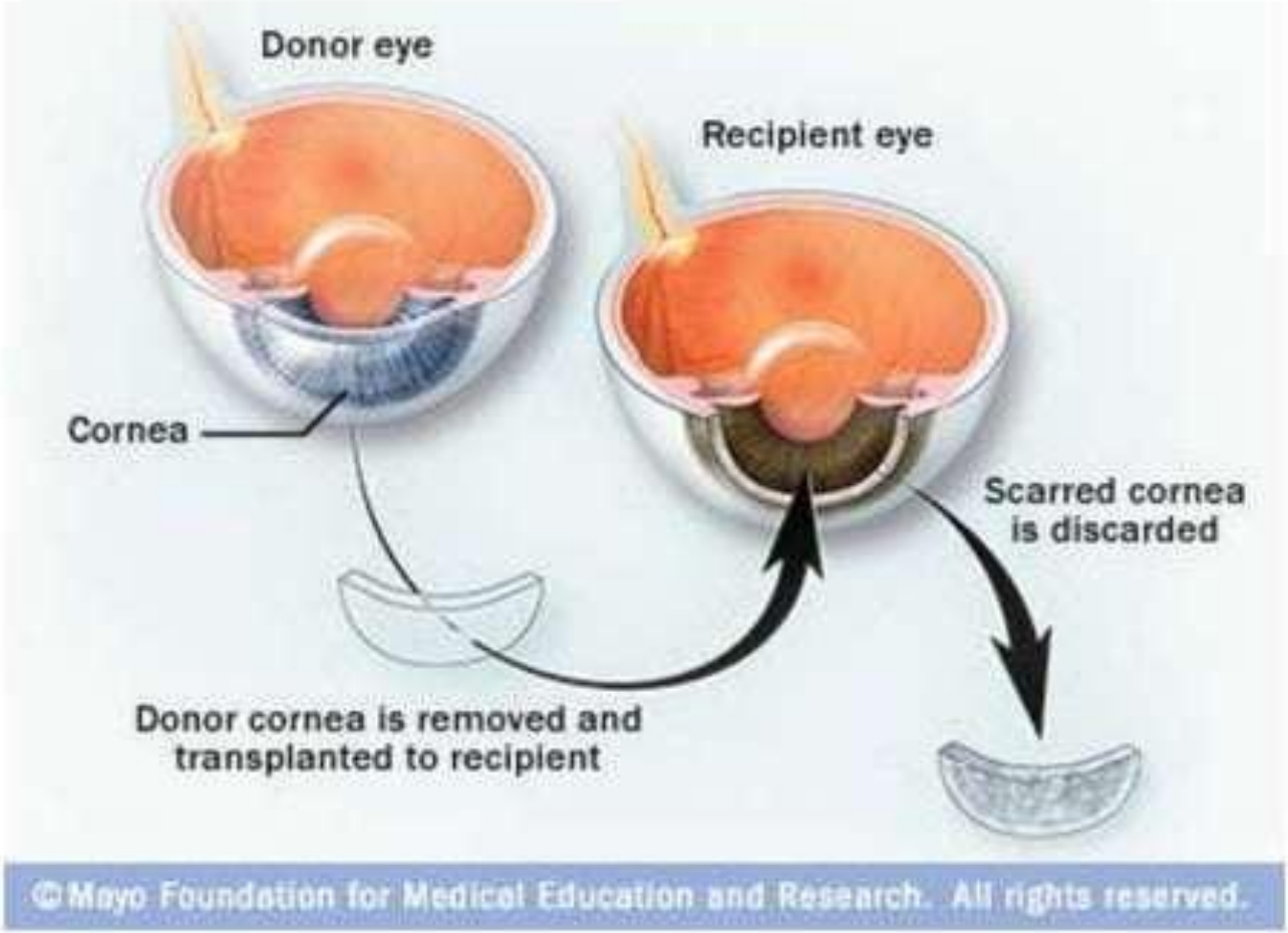
Corneal Transplantation

- (Keratoplasty)

Corneal Transplantation

- Corneal transplantation refers to surgical replacement of a full-thickness or lamellar portion of the host cornea with that of a donor eye.
- Allograft/autograft
- Full-thickness(Penetrating)/ Partial thickness (lamellar)

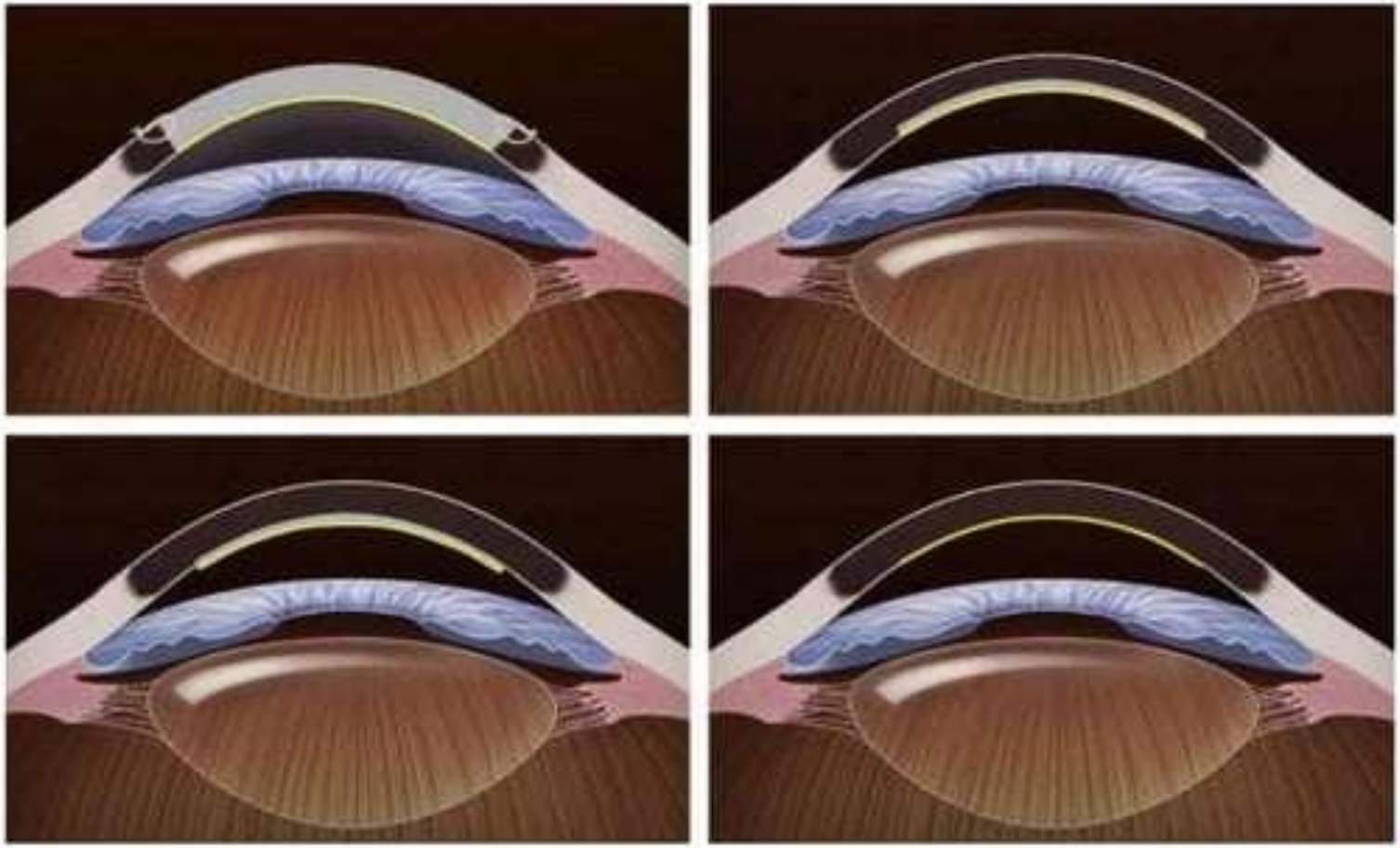
CORNEAL TRANSPLANTATION :SCHEMATIC



Types of Keratoplasty

- Optical – to improve vision
- Tectonic- to restore or preserve corneal integrity
- Therapeutic- to remove infected corneal tissue
- Cosmetic- to improve appearance

Keratoplasty : Schematic Diagram



Indications of Penetrating Keratoplasty(PK)

- Keratoconus
- Post- cataract surgery edema
- Corneal dystrophies and degenerations
- Mechanical or chemical trauma
- Microbial/postmicrobial keratitis
- Congenital opacity

Corneal Opacity

Vascularised Corneal Opacity

Preoperative Evaluation

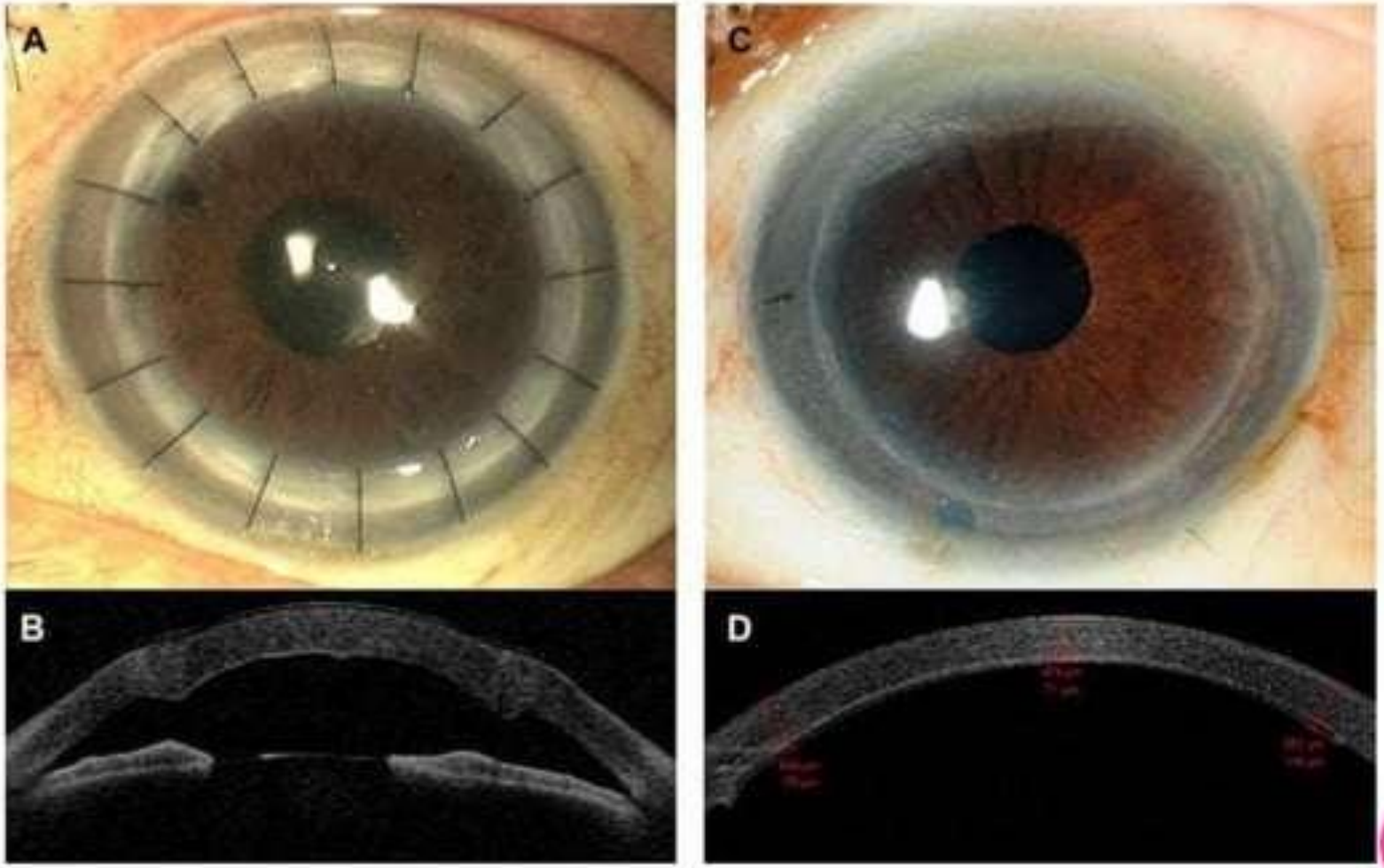
- Systemic evaluation
- A complete eye examination
- Examination of the ocular adnexa

Surgical Technique

- Determination of graft size
- Excision of donor cornea
- Excision of diseases host cornea
- Fixation of donor button
- Removal of viscoelastic substance

Removal of Corneal Button

Corneal Transplant



Intraoperative Complications

- Damage to the lens and/or iris
- Irregular trephine
- Poor graft centration
- Excessive bleeding from the iris and wound edge
- Choroidal hemorrhage
- Iris incarceration in the wound
- Damage to the donor endothelium

Postoperative Care

- Topical steroids and antibiotics
- Mydriatic
- Oral antiviral
- Removal of suture
- Rigid contact lens for residual astigmatism

Post operative Complications

- Infection
- Suture dehiscence
- Corneal allograft rejection (epithelial/ stromal/ endothelial)
- Secondary glaucoma

Prognostic factors

- Abnormalities of eyelid
- Tear film function
- Recurrent and progressive conjunctival
- Inflammation
- Stromal vascularisation
- Uveitis and anterior synechia
- Uncontrolled glaucoma

LAMELLAR KERATOPLASTY

- Lamellar keratoplasty refers to replacement of only a portion of the corneal layers of the host cornea with the graft.
- Indications:

  -Opacification of superficial corneal stroma

  -Marginal thinning or infiltration

  -Localised thining / descematocele formation

Types of Lamellar Keratoplasty

- Superficial/ Deep anterior lamellar keratoplasty (SALK/DALK)
- Descemet stripping automated endothelial keratoplasty (DSAEK)
- Descemet membrane Endothelial Keratoplasty (DMEK)

Anterior Lamellar Keratoplasty

Triple Procedure

- Cataract extraction
- Intraocular lens implantation
- Corneal transplantation

LEGAL ASPECTS IN INDIA

- Under the Transplantation of Human Organs Act, 1994 (THOA)

1. The qualification of doctors permitted to perform enucleation (surgical eye removal) has been reduced from MS (Ophth.) to MBBS.
2. Eye donation in India is always decided by the donor's surviving relatives and not by the actual donor.
3. Enucleating doctors always have to legally obtain a written consent from the relatives of the deceased before they actually remove the eyes.

ANY DOUBT...??

Don't Burn or Bury

Your Eyes.....

Help Others See Our Beautiful World Too!

THANK YOU