Fitting and Fabrication of the Ocular Prosthesis

Overview
- Types of artificial eyes
- History
- Types of Ocular implants
- Fitting and fabrication process
- Complications the Ocularist may experience
- Problems patients experience
- Basic care

Types of Artificial Eyes
- Custom Ocular Prosthesis
- Scleral shell
- Custom conformer
- Stock Eye
- Glass eye

Custom Ocular Prosthesis
- Polymethyl methacrylate (PMMA)
- Impression fit
- Custom painted
- Generally fit over an implant
- Wore for weeks or months without removal

Scleral Shell
- Over a blind disfigured eye
- PMMA
- Impression fit (Tetracaine)
- Custom painted
- Removed at night
- Correct volume loss
- Entropion
- Light sensitivity
Shell Motility

Scleral Shell

**Scleral Shell Wearing Schedule**

<table>
<thead>
<tr>
<th>SCLERAL COVER SHELL DAILY WEARING SCHEDULE</th>
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<tbody>
<tr>
<td>Day</td>
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<tr>
<td>Hrs</td>
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Custom Conformer

- PMMA
- Impression fit
- Expansion of the socket
- Treatment of congenital Anophthalmia/Microphthalmia

Anophthalmia

- Absence of globe
- Enlarge monthly
Hydrogel Conformer

- Surgically implanted
- Expands 10x original size
- Implant placed after expansion
- Followed with conformers or prosthesis

Sphere Hydrogel

Microphthalmia

- Small eyes
- Check monthly

Stock Eye

- Not Impression Fit
- Sometimes modified
- PMMA
- Removed nightly
- Poor motility
Glass Eye
- Hand blown glass
- Not common in the U.S.
- Advantage: being hollow
- Disadvantage: very breakable

History
- 1500’s first record of artificial eyes put in the socket
- Enucleation was not common until the middle of the 1800’s
- German craftsmen are credited with the invention of the glass eye in 1835
- Early 1900’s German craftsmen began touring the United States.
- Glass was used until the onset of World War II, US military hospitals developed the plastic eye and has been the preferred material in the U.S. since.

Ocular Implants
- Mules Sphere
- Allen
- Iowa
- Dermis fat graft
- Porous Implants (Medpor, Hydroxyapatite HA)

Mules Sphere Implant
- 1884 glass sphere implant
- Gold, silicone, rubber, acrylic
- Originally 11-13mm now more commonly 16-22mm
- Problems with Migration
- Used in both Enucleations and Eviscerations

Sphere Implants
- Allen Implant
- 1950’s
- Still used today
- Volume deficiencies
- Great motility
Allen Implant

- 1950's
- Four prongs
- Not used today
- Exposure Problems
- Good motility

Iowa Implant

- Dermis Fat Graft
  - Grows with children
  - Can be added on top of previous implant
  - Great at fixing volume deficiencies

Porous Implants

- Hydroxyapatite (HA) similar to human bone
- Sea coral
- First implanted in 1985
- Medpor/Bioceramic are synthetic versions of HA
- Can be pegged
- Exposure risk

Porous Implant

- PMMA Pegged HA
- Titanium Pegged Medpor
- 8 weeks post-op HA
Motility Pegs

Fitting/Fabrication Process
- Consultation
- Impression
- Modeling/Sculpting
- Painting
- Final Fitting
- Adjustments
- Normally takes 8 total hours
- 1-2 days
- 5-7 years

Consultation
- Explain the process and ease fears
- Realistic and Unrealistic expectations
- Basic care of the prosthesis

Impression
- Gives us the correct shape to fabricate the posterior of the prosthesis
- Alginate material that is derived from seaweed
- Pain free
- 45 second set up time

Impression Posterior
- Clear Trial Plate
  - Allows us to check the impression
  - Look for gapping
  - Pressure points

- Modeling/Sculpting
  - Temporary wax material
  - Correcting position, gaze and lid opening

- Wax Modeling

- Fabrication

- Painting/Coloring
  - Match the patient’s companion eye with them present
  - This involves matching the iris color, limbal blend, scleral tinting and veining
  - Can involve using paint, colored pencils and silk threads for the veins

- Digital Photos
  - Colors not correct
  - Lacking Depth
  - Possible FDA issues
Painting

Veining/Scleral Tinting

Corneal Cap Processing

Painting Final Check

Final Polish
Final Fitting

Adjustments

- Color work
- Enlargement or Reduction
- Comfort
- Ideally we like to see everyone back in 3-4 weeks

Complications Ocularists Experience in Fitting

- Exposed Implants
- Superior Sulcus Deformity
- Upper Lid Ptosis
- Lower Lid Laxity
- Socket contraction

Exposed Implants

- May need surgical correction
- Vaulting the prosthesis may help
- Can happen with nearly all types of implants

Exposure

Exposure
Exposure

Sunken Superior Sulcus
- Sometimes can be corrected with the prosthesis
- May be able to be corrected surgically
- Hidden well with glasses

Mucosal Graft

Sunken Superior Sulcus

Ptosis
- May be corrected with the prosthesis
- Surgical correction could be the best option

Anterior Superior Sulcus Bump
Ptosis Crutch

Lower Lid Laxity
- May cause retention issues
- Thinning the inferior edge of the prosthesis can help
- Surgery is often required

Lower Lid Laxity

Socket Contraction
- Chemical burns
- Radiation Exposure
- Infection
- Ill fitting prosthesis

Socket Contraction
Attempted Lid Closure
Pressure Conformer

Complications Patients may Experience
- Itching
- Discharge
- Rotation
- Retention

Itching
- Dryness
- Allergies
- Rewetting Drops are helpful
- Silicone based prosthetic lubricants are good
- Lubricating Ointments in the evening

Discharge
- Generally we refer back to the Physician to rule out infection
- Can be dryness related
- Lack of lid closure (Lagophthalmos) is a big factor

Rotation
- Rubbing the eye can cause this
- In need of enlargement or new impression
- Good indication a child needs to be refit
- When the prosthesis is upside down usually you will see all white sclera

Rotated Prosthesis
- Rotated
- Straight
Rotation Correction

- Rub towards the nose
- Possible time for a new impression
- Grinding the posterior concave
- Lid surgery may be the best option

Retention

Basic Care

Insertion of an Artificial Eye
- 1) Apply rewetting drops or water to the anterior (front) and posterior (back) of the eye prosthesis.
- 2) Lift upper lid with the index finger to create an opening.
- 3) Slide top edge of prosthesis under the upper lid.
- 4) Release the upper lid once the prosthesis is in.
- 5) Pull down the lower lid and blink until prosthesis sets into the correct position.

Basic Care

Removing an Artificial Eye
- 1) Open eyelids, apply suction cup to the prosthesis and squeeze the handle. After attaching, hold onto suction cup lightly in hand.
- 2) Pull down the lower lid with finger. Tilt the prosthesis back and out, lifting out and over the lower lid.
- 3) Once removed, squeeze suction cup handle to release.

Basic Care

Cleaning
- Warm water and a gentle soap are good for cleaning an eye prosthesis. Baby Shampoo is the best choice
- This should be done once per month with a custom prosthesis or once per day with a custom shell
- Professional polishing is recommended every six months
- Alcohol will destroy a plastic prosthesis

Basic Care

Polishing
Polishing

Crazed Plastic

Novelty Eyes

Summary
- PMMA
- Replacement 5-7 years
- Polishing every 6 months
- NEVER use alcohol

Thank you
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