Fitting and Fabrication of the Ocular Prosthesis

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Overview

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

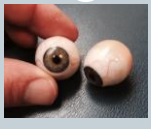
Types of Artificial Eyes

- Custom Ocular Prosthesis
- Scleral shell
- Custom conformer
- Stock Eye
- Glass eye

Custom Ocular Prosthesis

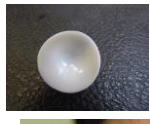
- Polymethyl methacrylate (PMMA)
- Impression Fit
- Custom painted
- Generally fit over an implant
- Wore for weeks or months without removal

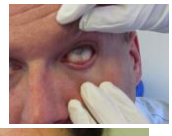
Custom Ocular Prosthesis



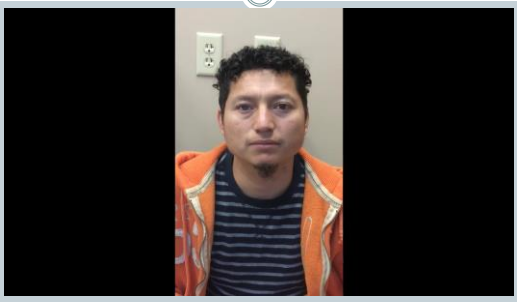
Scleral Shell

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

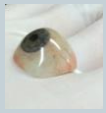




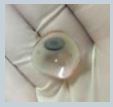
Shell Motility



Scleral Shell



Anterior



Posterior

Scleral Shell Wearing Schedule

SCLERAL COVER SHELL
DAILY WEARING SCHEDULE

Day	1	2	3	4	5	6	7	8	9	10	11	12
Hrs	3	3	3	4	5	6	7	8	9	10	11	12

Custom Conformer

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

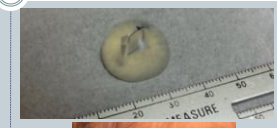
Anophthalmia

- Absence of globe
- Enlarge monthly

Anophthalmia

Hydrogel Conformer

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



Hemisphere Hydrogel

	Before Swelling		After Swelling*		
Item	Volume	ø	Volume	ø	Swelling Time*
Hemisphere 0.4 ml	0.06 ml	6 mm	0.4 ml	11.2 mm	1 day
Hemisphere 0.9 ml	0.13 ml	8 mm	0.9 ml	14 mm	1 day
Hemisphere 0.9 ml (drill hole parallel)	0.13 ml	8 mm	0.9 ml	14 mm	1 day
Hemisphere 1.5 ml	0.20 ml	9 mm	1.5 ml	18 mm	1 day
Hemisphere 2.0 ml	0.28 ml	10 mm	2.0 ml	20 mm	2 days

Sphere Hydrogel

	Before Swelling		After Swelling*		
Item	Volume	ø	Volume	ø	Swelling Time*
Sphere 1 ml	0.12 ml	6 mm	1 ml	12.4 mm	1 day
Sphere 2 ml	0.30 ml	8 mm	2 ml	15.5 mm	2 days
Sphere 3 ml	0.30 ml	8 mm	3 ml	18.0 mm	3 days
Sphere 4 ml	0.43 ml	9 mm	4 ml	19.7 mm	4 days
Sphere 5 ml	0.43 ml	9 mm	5 ml	21.8 mm	5 days

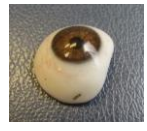
Microphthalmia

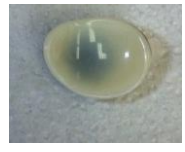
- Small eyes
- Check monthly

Microphthalmia

Stock Eye

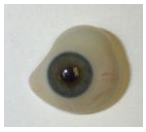
- Not Impression Fit
- Sometimes modified
- PMMA
- Removed nightly
- Poor motility





Glass Eye

- Hand blown glass
- Not common in the U.S.
- Advantage being hollow
- Disadvantage very breakable

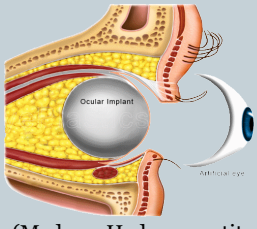


History

- 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

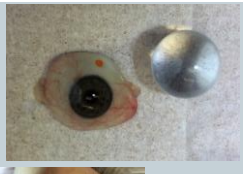


- Porous Implants (Medpor, Hydroxyapatite HA)

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 Evisceration

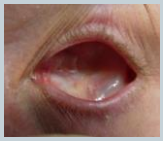
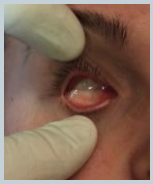
Sphere Implants



Allen Implant

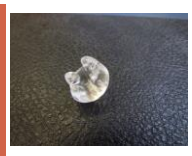
- 1950's
- Still used today
- Volume deficiencies
- Great motility

Allen Implant


Iowa Implant

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



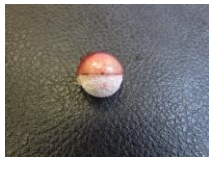
Iowa Implant

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



8 weeks post-op HA

PMMA Pegged HA

Titanium Pegged Medpor

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

Impression Posterior

Clear Trial Plate

- Allows us to check the impression
- Look for gapping
- Pressure points

Modeling/ Sculpting

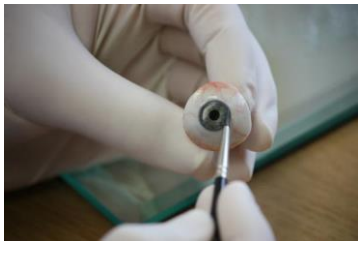
- Temporary wax material
- Correcting position, gaze and lid opening

Wax Modeling

Fabrication

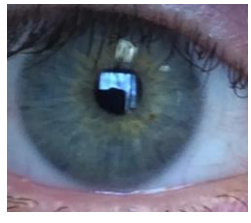
Painting/ Coloring

- 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

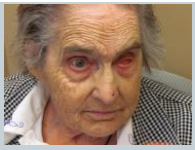


Digital Photos

- Colors not correct
- Lacking Depth
- Possible FDA issues



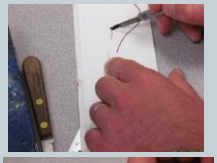
Painting



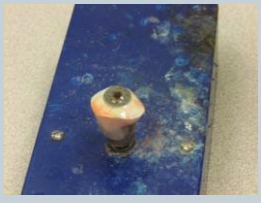

Painting



Veining/Scleral Tinting

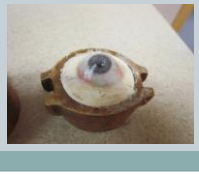


Painting Final Check

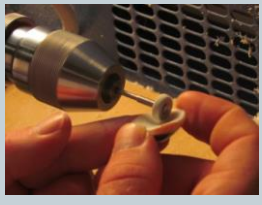



Corneal Cap Processing



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

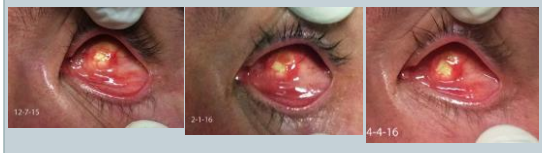
Exposed Implants

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

Exposure

Exposure

Exposure



Mucosal Graft

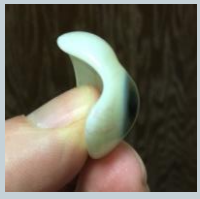
Mucous Membrane Graft Repair

Sunken Superior Sulcus

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

Sunken Superior Sulcus

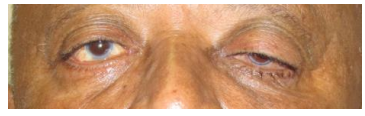
Sunken Superior Sulcus



Anterior Superior Sulcus Bump

Ptosis

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

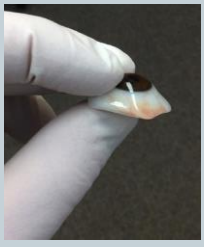


Ptosis Crutch

Lower Lid Laxity

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

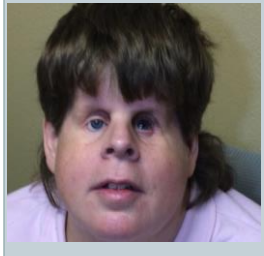
Lower Lid Laxity



Socket Contraction

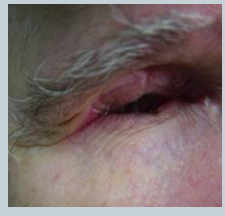
- Chemical burns
- Radation Exposure
- Infection
- Ill fitting prosthesis

Socket Contraction

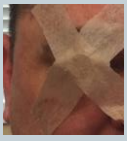


Attempted Lid Closure

Socket Contraction



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

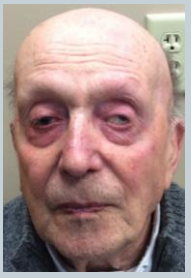
Discharge

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

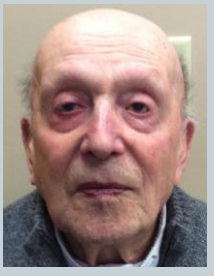
Rotation

- 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

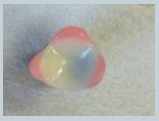


Rotated



Straight

Rotation Correction



Retention

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

Basic Care

Insertion

- **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

Removal

- **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.

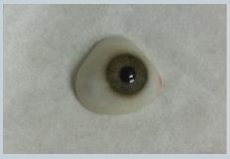
Basic Care

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

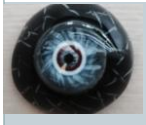
Polishing

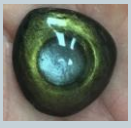
Polishing

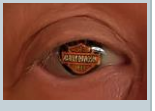


Crazed Plastic

Novelty Eyes







Summary

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

Thank you

Tim@MidwestEyeLabs.com