

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
- Financial considerations

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



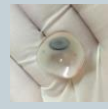
Shell Motility



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/ Microphthalmia



Anophthalmia

- Absence of globe
- Enlarge monthly

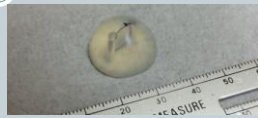


Anophthalmia



Hydrogel Conformer

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



Hemisphere Hydrogel



Item	Before Swelling		After Swelling*		Swelling Time*
	Volume	d	Volume	d	
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



Item	Before Swelling		After Swelling*		Swelling Time*
	Volume	d	Volume	d	
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

Congenital Anophthalmia



3 years

Microphthalmia

- Small eyes
- Check monthly



Microphthalmia



Microphthalmia



7 months



10 months



12 months

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

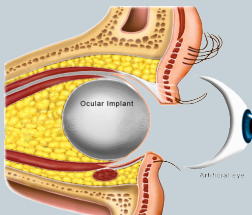


History

- 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



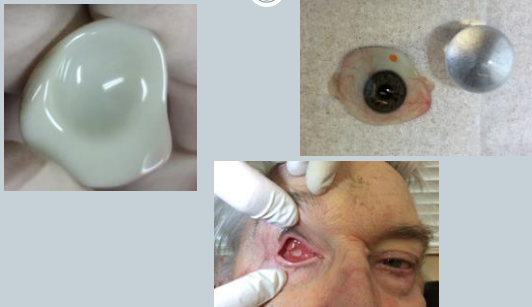
- Porous Implants (Medpor, Hydroxyapatite HA)

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

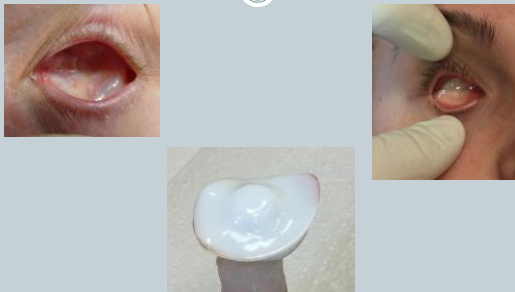


Allen Implant

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



Allen Implant



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



Titanium Pegged Medpor

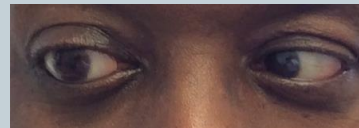
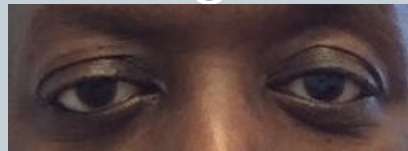
PMMA Pegged HA

8 weeks post-op HA

Motility Pegs



Pegged Implant



Fitting/Fabrication Process

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

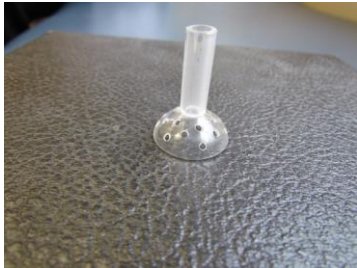
Consultation

- 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



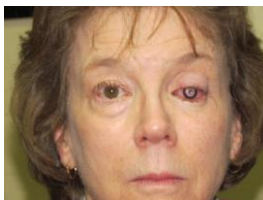
Clear Trial Plate

- 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



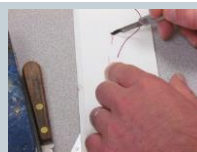
Painting



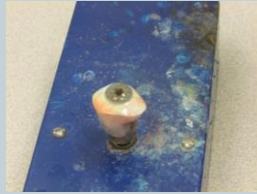
Painting



Veining/Scleral Tinting



Painting Final Check



Corneal Cap Processing



Final Polish



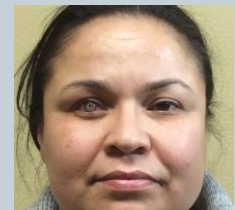
Final Fitting



Fitting



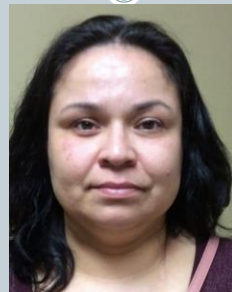
Fitting



Fitting



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

Exposure



Sunken Superior Sulcus

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



Sunken Superior Sulcus



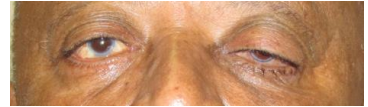
Sunken Superior Sulcus



Anterior Superior Sulcus Bump

Ptosis

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

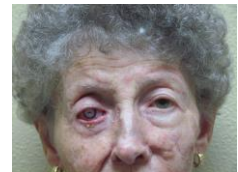


Ptosis Crutch



Lower Lid Laxity

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



Lower Lid Laxity

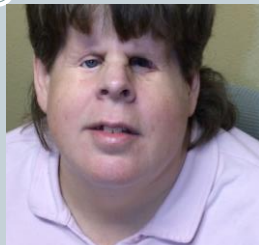


Socket Contraction/Retraction

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

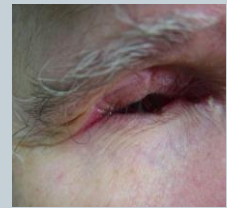


Socket Contraction



Attempted Lid Closure

Socket Contraction



Retraction



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

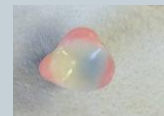


Rotated



Straight

Rotation Correction

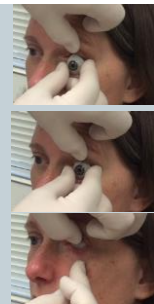


Retention

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

Basic Care

- **Insertion 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.



Insertion

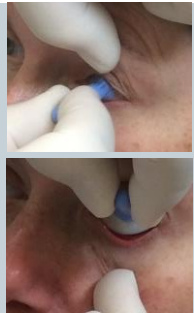
Prosthetic Eye Insertion



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.



Removal

Prosthetic Eye Removal



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



Polishing



Crazed Plastic



Medically Necessary

- Custom Ocular Prosthesis V2623
- Scleral Cover Shell v2627
- Custom Conformer v2628
- Polishing/Resurfacing of the prosthesis v2624
- New fitting every 5 years
- Polishing twice within a calendar year
- Sooner with order of medical necessity from referring provider

Novelty Eyes



Summary

- PMMA
- Replacement 5-7 years
- Polishing every 6 months
- NEVER use alcohol
- Artificial Eyes/Scleral Shells are medically necessary

Thank you

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