CONTACT LENS MANUFACTURING PROCESS
MANUFACTURING METHODS OF RGP LENSES
RGP LENS MANUFACTURING ASPECTS

Care with:

- Blocking
- Cutting
- Polishing
- Solvents
RGP LENS MANUFACTURING

- Care is required during RGP contact lens manufacture

- Especially when blocking and solvent cleaning

- Care must also be taken with cutting and polishing
Poor wettability may be associated with:

- Over polishing which may result in localized heating of the lens blank surface

- Either alone or in combination with over polishing, the use of incorrect solvent affect the wettability of the finished product
FLURO–SILOXANE ACRYLATES AND SILOXANE ACRYLATES

Manufacturing disadvantages:

- Softer materials
- Difficult to get highly polished surface
- Susceptible to ‘blurring’
- Solvents can affect the surface
- Significant flattering of BOZR
- Higher DK lenses difficult
- Lower reproducibility
- More difficult to manufacture
- More sophisticated equipment required
- Increased production cost
- Lower yields than PMMA.
RGP lenses: Manufacturing methods

Lens fabrication techniques

- Lathing
- Molding
Lathing:

- Original method

- Well understood and longstanding method of fabricating anything that can be made symmetrical e.g. A contact lens
Advantages:

- Established technology
- Simple
- Wide range of parameters
- Suits most material
- Relatively economic to start production
Disadvantages:

- Complex designs are difficult
- Labour intensive
- High cost per lens
- Variable surface finish
- Relatively slow
- Volume production difficult
Molding:

- Most recent adaptive method

- Lens material enters a double-sided mold as a liquid and solidifies in situ as a result of polymerization.
Advantages:

- Lower cost per lens
- Rapid process
- Volume production
- Good surface quality
- Good reproducibility
- Complex designs possible
Disadvantages:

- Expensive to start production
- Expense limits parameter range
- Not all material suitable
- Essentially for stock lenses only
RGP Bifocals: Manufacturing process

- Concentric and progressive bifocals are made using conventional lathing (or) molding.
Manufacturing of Soft contact lens
Manufacturing methods:

- Molding – anhydrous (xerogel)
- Spin casting
- Lathing-xerogel
- Molding / Lathing combination
- Spin casting / Lathing combination
- Molding-stabilized soft
Cast molding

- Monomer in liquid form introduced into a female mold which defines the front surface shape.

- In double sided mold UV-transparent male mold is made to be clamped together.

- Process requires strict environmental control.
Lathing:
- Raw material used is an anhydrous (xerogel).
- Special contact lens lathes are used, numerically controlled by a computer.
  - Requires strict control of environment, especially humidity.
  - Hydration of the lens is required after lens completion.
  - The lens is then sealed in normal saline prior to sterilization.
  - The package is then autoclaved.
Spin casting:

- The raw materials are liquid monomers
- Monomers are introduced into a spinning mold in a controlled environment of CO2 at high temperature
  - The mold defines the front surface
  - Produce a good surface finish
  - Back surface finish depends on surface tension
- Secondary manufacturing procedures include edge finishing
Spin casting / Lathing combination

- Starts with liquid monomers
- Front surface lathed to give BVP and design
Stabilized soft molding:

- Developed for volume production.
- Quick hydration
- Good optical property
- Good reproducibility
- Better surface quality
Thank You
References

- 1) IACLE Modules
- 2) CLIO modules
- 3) Clinical Refraction - Borish