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 Co_2 at high temperature

- The mold defines the front surface

- Produce a good surface finish

- Back surface finish depends on surface tension

- Secondary manufacturing procedure 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