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**Multifocal Contact Lenses**
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- Soft Contact Lens New Fits
  - Spherical 70%
  - Toric 23%
  - Multifocal 7%

- Pre-fitting Considerations
  - Refractive error
    - Manifest refraction
      - Spherical
      - Astigmatic
    - Add power
  - Visual needs
    - Distance
    - Near
    - Intermediate
  - Anatomical considerations
    - Pupil
      - Size
        - Age 20 - 5mm-daylight and 8mm-night
        - Age 40 - 4mm-daylight and 6mm-night
        - Age 60 - 3mm-daylight and 4.25mm-night
        - Age 80 - 2mm-light and 2.5mm-night
    - Dynamics
      - Loss of iridic muscle fiber
  - Cornea
    - Radius
      - “K-readings”
      - Topography
    - Diameter
      - Average HVID – 11.8 mm
      - Range of HVID – 10.5 to 13.0 mm
      - Effect on fit of contact lens
  - Lid
    - Position
      - Corneal health
      - Crystalline lens
        - Loss of contrast sensitivity
        - Inability to cope with reduced illumination
- Lids and lashes
  - Meibomian glands
  - Lid margin disease
  - Reduced muscle tone
  - Diminished skin elasticity
- Tear film
  - Tear break up time
  - Lacrimal lake (tear meniscus)
  - Epithelial Thickness
- Soft Contact Lens Multifocal Options
  - Simultaneous vision
    - Distance, intermediate and near images of equal intensity are presented to the retina
    - Requires adaptation
    - Optical factors
      - Aspheric design
        - Distance center designs
        - Near center designs
      - Balanced Progressive Technology design
        - “D” lens (dominant eye)
          - Center – spherical for distance
          - Middle - progressive intermediate
          - Periphery – aspheric for near
        - “N” lens (non-dominant eye)
          - Center – spherical for near
          - Middle - progressive intermediate
          - Periphery – aspheric for distance
      - Concentric design
        - Center-distance
        - Center-near
  - Toric Multifocal options
    - Translating or alternating vision
      - Lens translates to a different position in front of the pupil
      - Lower lid position is critical
    - Replacement Modality
      - Reusable - quarterly, yearly replacement
      - Monthly replacement
      - Daily replacement
- Fitting Techniques
  - Aspheric lens designs
    - +.75 to +1.25 use low add OU
    - +1.50 and over use high add OU
  - Balanced Progressive Technology design
    - Determining near/distance eye
      - Dominant eye for distance
• Non dominant eye for near
• Swinging plus test
  o Maximum distance correction OU
  o Alternate +1.50 over each eye while viewing eye chart at distance
  o Concentric designs

• Post-fitting Consideration
  o Physiological factors
    ▪ Neurological switching
    ▪ Blur interpretation
    ▪ Accepting visual compromise
  o Visual acuity problems
    ▪ Refractive error
      o Over-refraction
        ▪ Hand held lenses
        ▪ Normal room lighting
    ▪ Lens dehydration
      o Reflected light from lens surface
        ▪ Keratometer
        ▪ Videokeratography
  ▪ Pupil size
    o Assessing center zone size
    o Assessing peripheral zone size
    o Assessing aspheric zone size
    o Correlating pupil size with zone size
  ▪ Lens position
    o Centration on cornea
    o Centration over visual axis
      ▪ Angle kappa
        ▪ Corneal topography
        ▪ Position of the optics in relation to the visual axis
  o Comfort Problems
    ▪ Contact lens – cornea relationship
    ▪ Surface deposits
    ▪ Solution reactions
    ▪ Contact lens dehydration
    ▪ Edge design
• Constructing a Custom Design Multifocal lens
  o A mathematical approach
    ▪ Importance of HVID
      ▪ Different methods for accurate HVID
      ▪ Diameter considerations
    ▪ Importance of corneal curvature
- Why measure the cornea
- Base curve considerations
  - Importance of pupil size
    - Different methods of measuring pupil size
    - Near versus Distance centered multifocals
    - Center, periphery and aspheric zone determinations
    - Modifications dependent and patient visual results on follow up visits
      - Understanding the arc length design
        - Mathematical formula
        - Calculator
      - Verification of power curves with the NIMO
- Screening to identifying the right patient
  - Case history
    - Critical demand patient
    - Early presbyopia
    - Advanced presbyopia
  - Myopia control and Multifocals
    - Peripheral defocus
  - Hyperopia control
    - Peripheral post focus
- Final thoughts