I. Aniseikonic Effects from Anisometropia

A. Aniseikonia
   1. Overall
   2. Meridional

B. Origin of anisometropia
   1. Axial
   2. Refractive
   3. Retinal (e.g., epiretinal membranes)

C. Approaches to patient prescriptions
   1. Axial
      a. Traditional thought: use spectacles (Knapp’s law)
      b. Current view is to try to use treatments closer to the ocular surfaces
         1). Contact lenses
         2). LASIK
   2. Refractive
      a. First consideration should be contact lenses, LASIK, etc
      b. Overall vs meridional
   3. Alternative solutions
      a. Take advantage of variables that affect spectacle magnification
         \[
         SM = \left( \frac{1}{t} \right) \left( \frac{1}{1 - \frac{t}{F_1}} \right) \left( \frac{1}{1 - h(BVP)} \right) \equiv 1 + \left( \frac{t}{n} F_1 \right) + h(BVP)
         \]
         \(t=\text{center thickness, } n = \text{index, } F_1 = \text{front surface power,}\)
         \(h = \text{vertex dist+3 mm, BVP = back vertex power}\)
         1) Steeper base curve increases SM for plus or minus
         2) Larger t increases SM for plus or minus
         3) Increasing vertex distance increases SM for plus, decreases SM for minus
         4) Reducing plus BVP reduces SM, reducing minus BVP increases SM
         5) Index of refraction has little effect on SM.
      b. Modify lenses to reduce known or anticipated spectacle magnification
         1) Reduce vertex distance as much as possible.
         2) Change BVP to reduce anisometropia, intentionally compromising with reduced clarity to attain increased comfort.
            a) Modify sphere of one or both lenses.
            b) Modify cylinder power (usually reducing it), with or without maintaining spherical equivalent.
            c) Modify axes to make them more parallel
            d) Just because a lens gives a clearer image does not guarantee it will be more comfortable than a lens that produces a blurred image.
         3) Modify base curves and center thicknesses
            a) Equal BCs and CTs work best on plus lenses
               • Not useful on minus lenses.
               • CTs already equal.
               • Making BC steeper increases vertex, neutralizing gain from BC.
      c. Iseikonic glasses
         1) Measure or estimate aniseikonia
            a) Aniseikonia Inspector software
            b) New Aniseikonia Test (Awaya)
            c) Estimate: Polarized acuity target
            d) Estimate: 1% per diopter of anisometropia in spectacle plane
Prescribing for Anisometropia and Aniseikonia

2) Design lenses to make SM more equal, manipulating BC, t, n, h more rigorously, such as using a spreadsheet.

II. Prism Induced by Anisometropia

A. Horizontal
B. Vertical
   1. Prentice’s rule
   2. Compensated in single vision by keeping eyes close to OCs
   3. Trouble lies with multifocal lenses
   4. Prism adaptation
      a. Adaptation to vertical prism
         1) Tendency for vertical phoria to revert to its magnitude prior to induced prism
         2) Variable among patients
            a) Few minutes to several hours
            b) Complete or incomplete
         3) Many adapt to induced prism from anisometropia & don’t need prism
         4) Others do not adapt, are symptomatic, and need prism
            a) Slab off, reverse slab off
            b) Measuring slab off prism
               • Peters lens clock (LC) technique
                  Slab off (Δ) = LC_A - LC_B
                  LC_A = lens clock reading straddling slab off line, pins vertical, peripheral to seg
                  LC_B = lens clock reading, pins vertical in the distance portion of the lens
                  Doesn’t work well for progressive addition lenses where surface power is changing on the front surface of the lens
               • Lensometer technique
                  Place lens on lens stop, centered on slab off line, away from segment
                  2 images seen
                  Slab off (Δ) = Difference in displacement of 2 images
                  Image displaced downward with BU slaboff, upward with BD reverse slaboff