Can the macula still be attached if view is obscured by a bullous retinal detachment?

William E Smiddy, M.D.
Miami, FL

Lev Kapitanski, PhD, DrSci, Harry W Flynn, MD

**Purpose:** To determine if it is possible for the macula to remain attached if a bullous retinal detachment blocks the examiner's view of the macula.

**Methods:** A mathematical analysis of the arc length of the attached retina versus the length of a detached retina necessary to obscure the macula (hang over the visual axis) was performed. The shape and dimensions of the retina were based first on a Gullstrand, spherical model with the detached retinal configuration following legs from the ora serrata and fovea to the center of the circle. A second, more rigorous, iteration was based on a published study that established the retina shape to be an oblate ellipsoid (Atchison DA, et al. IOVS, 2005). We considered the sagittal plane and the effect of myopia and ora serrata position on the calculations. The angle between the ora and fovea was calculated from standard anatomic measurements and verified by measurement of postmortem slide photographs. The final iteration modeled the detached retina as a catenary since it more likely approximates the shape of the hanging, detached retina.

**Results:** The angle between the fovea and ora serrata was 105°. In the Gullstrand model and the Atchison ellipsoid model with the radial leg pathlength, the arc length of the retina is less than the pathlength of the legs for all angles.

**Conclusions:** If the macular center cannot be viewed due to a bullous superior retinal detachment hanging into the examiner's view, it is unlikely but possible that the macula remains attached. If the view is obscured by at least a disc diameter below the fovea, it is not mathematically possible for the fovea to be attached.