RGP Contact Lenses

The new generation of RGP lenses combines the optical qualities of PMMA and the oxygen permeability of soft lenses. Generally, RGP lenses can deliver two to three times more oxygen to the cornea than soft lenses of the same thickness. However, to maintain rigidity (which is important for the proper lens fit and correction of astigmatism), RGP lenses are generally thicker than soft lenses. Newer RGP lenses still transmit much more oxygen to the cornea than do most soft lenses, while covering only the central 75% of the cornea. RGP lenses, unlike soft lenses, also exchange up to 20% of the postlens tear volume per blink.

RGP lenses have been investigated for continuous-wear use, and some have been approved for 1 to 30 days of extended wear. The use of continuous-wear lenses is somewhat controversial as these lenses have been implicated in causing corneal ulcers (eruptions on the corneal surface), which, in rare instances, can lead to partial or complete blindness.

RGP lenses are available in several types of materials. One type of RGP lens is composed of silicone acrylates that combine silicone with methyl methacrylate and methacrylic acid and/or hydroxyethyl methacrylate (HEMA) in varying amounts. This material is relatively stable and fairly inflexible. Examples of this type of lens include Polycorn II and Paraperm O₂.

Fluorine may also be a component of RGP lenses, in the form of either fluorosilicone acrylate or fluoropolymer lenses. An example of this type of lens is the Boston Equalens.

Of the many RGP materials available, the fluorosilicone acrylates are the most commonly used.⁶

Advantages

Advantages of RGP lenses vary depending on the type of materials used. Fluorinated lenses offer the advantages of increased oxygen transmissibility and reduced lipophilicity problems. These lenses also have less surface reactivity, thereby decreasing tear deposits.

Disadvantages

Disadvantages of RGP lenses also vary depending on the type of materials used. Silicone acrylate lenses have less