attachments are left intact. Enucleation involves the removal of the globe from the orbital socket, together with the scleral envelope and a portion of the optic nerve, while the conjunctiva, Tenon's capsule, and extraocular muscles are spared; this procedure is mandatory if the patient suffers from intraocular cancer (e.g., retinoblastoma) that cannot be eradicated by evisceration. Preoperative wrapping of the implant within a foil of scleral tissue or smooth polymeric material is useful to prevent conjunctival abrasion and to facilitate the reattachment of extraocular muscles on the implant surface in order to transmit good motility to the aesthetic ocular prosthesis. The motility of the prosthesis can be improved by placing a peg in the front of the orbital implant (Fig. 13.2), so that the prosthesis can move following closely the movement of the healthy contralateral eye. Materials in current use to produce orbital implants include nonporous spheres of silicone and PMMA and porous spheres of hydroxyapatite (Bio-eye), polyethylene (Medpor) and alumina (Bioceramic implant) (Baino and Vitale-Brovarone, 2015). Porous orbital implants are typically fibrovascularized, that is, their three-dimensional (3D) network of pores is invaded by connective tissue and blood vessels which help to anchor the implant to orbital tissues and permit immune surveillance. Bioactive glasses show promise in this field, although at present only one orbital implant comprising 45S5 Bioglass particles embedded in a Medpor porous matrix is available on the market.

Bioactive glasses and glass-ceramics have also been used for the fabrication of artificial cornea, also called keratoprosthesis, which is implanted in the eye to replace the central area of a diseased cornea in patients who cannot undergo corneal transplant. An artificial cornea typically comprises an optically clear element made of PMMA, which is capable of transmitting light from the exterior of the eye to the retina, and a supporting flange or "skirt" that keeps the keratoprosthesis anchored to surrounding tissue (Chirila et al., 1998) (Fig. 13.3). Materials to fabricate the "skirt" include autologous tissue from the patient's teeth jaw bone (the so-called Strampelli's osteo-odonto-keratoprosthesis (Strampelli, 1963; Gomaa et al., 2010)) and biocompatible polymers (e.g., porous PMMA); bioactive glasses were recently proposed to improve biointegration of the keratoprosthetic "skirt" to the host corneal tissue.

Major bioactive glass and glass-ceramic formulations experimented with in ocular surgery are collected in Table 13.2. Furthermore, Table 13.3 provides an overview of bioactive glass-based implants that have been proposed and, in some cases, clinically adopted in ocular surgery.

13.3 BULK IMPLANTS

Historically, nonporous devices produced by the melting-quenching route were the first bioactive glass products launched on the market and clinically implanted during surgery (Hench, 2006). Typical examples include 45S5 Bioglass ($45SiO_2$-$24.5Na_2O$-$24.5CaO$-$6P_2O_5$ wt%) artificial middle ear bones (trade named as MEP and later Douek-MED) (Wilson et al., 1995) and the Endosseous