orbital volume replacement (Sami et al., 2007). In the field of artificial cornea, resorption of the porous "skirt" around the optical core is an unwanted effect as it can lead to the loosening of the keratoprosthesis (Ricci et al., 1992); this problem was the major reason why synthetic alternatives to the tooth-derived "skirt" of Strampelli's keratoprosthesis have been proposed (Viitala et al., 2009; Sandeman et al., 2003). In summary, competition exists between the maintenance of adequate structural integrity in vivo (low solubility) and the need for adequate release of therapeutic ions (high reactivity). This issue is highly relevant to all biomedical applications in which bioactive materials are used as a joining element between the various components of a complex prosthetic device (Baino et al., 2016b, 2017) or should act as a "permanent bridge" between the implant and tissue, as in the case of keratoprosthetic "skirts" (Viitala et al., 2009). This limitation could be solved by applying functionalization treatments (Wu et al., 2015) or coating strategies (Baino and Verné, 2017), thereby leaving the implant surface to react with tissues and maintaining adequate mechanical integrity of the backbone material.

13.8 CONCLUSIONS

The recent literature witnesses that the applications of bioactive glasses and glass-ceramics in medicine are rapidly expanding well beyond bone and dental repair, which was unthinkable when research began half a century ago (Baino et al., 2016c). These bioactive materials have proved to be suitable for applications in ocular surgery due to their highly versatile nature in terms of both composition, which strongly influence their physicochemical, mechanical, and biological properties, and processing (solid products, porous implants, coatings) (Baino, 2015).

At present, however, the potential of bioactive glasses in ophthalmology is not yet fully exploited and the research in this field is less popular compared to other areas, probably due to the high specificity and the difficulty of building inter- and cross-disciplinary research teams comprising biomaterials researchers, glass chemists, bioengineers, biologists, and ophthalmic surgeons.

Bioactive glasses are known to bond both to bone and to soft collagenous tissues, which are key properties for implants used in the repair of orbital bone fractures (Thompson, 2011; Suominen and Kinnunen, 1996; Kinnunen et al., 2000; Aitasalo et al., 2001; Peltola et al., 2008). Stimulation of angiogenesis and bonding to fibrovascular tissue are essential requirements to ensure the postoperative success of porous orbital implants, as fibrovascularization is known to reduce the risks of migration and infection (Xu et al., 1997a, 1997b; Naik et al., 2007; Ma et al., 2011). Moreover, it has been reported that porous bioactive glasses can promote the adhesion and proliferation of keratocytes (Huhtinen et al., 2013; Linnola et al., 1996), which makes them promising candidate materials for a new generation of keratoprostheses.