TABLE 9.2 Materials Other Than Bioactive Glass Used in Periodontal Therapy

Material	Comments
Hydroxyapatite	Similar composition to bone. Mixed clinical results
Tri-calcium phosphate, αβ	Good resorbability, good clinical outcomes
Biphasic calcium phosphate	Biodegradable. Useful for bone defects
Calcium sulphate	Used as a barrier. Properties improved by mixing with bone allograft
Degradable polymer systems	Includes chitosan, polylactic acid, lactic acid/glycolic acid copolymer. Used as delivery vehicles (drugs, growth factors) to affected sites

cementum and alveolar bone, a process which may involve so-called guided tissue regeneration (Shue et al., 2012).

Some of the most frequently used materials for periodontal therapy are shown in Table 9.2. Their features will be considered briefly in the rest of this section of the chapter, but full details of the use and clinical outcomes are not included. For these, the reader is directed to the references cited.

Natural polymers such as chitosan have mainly been used as delivery vehicles for biologically important molecules. For example, chitosan has been used to deliver DNA (Akncbay et al., 2007) and growth factors (Zhang et al., 2006; Akman et al., 2010). Synthetic polymers (polylactic acid or lactic acid-glycolic acid copolymers) have been used to create artificial membranes capable of being resorbed (Hou et al., 2004; da Silva Periera et al., 2000). The use of such resorbable membranes allows the natural periodontal ligament to regenerate and does not then need further surgery to remove the synthetic materials (Hou et al., 2004).

As Table 9.2 shows, a variety of calcium phosphate materials have been used, and these typically have good properties. Their composition resembles that of bone mineral, and they are bioactive. This allows them to promote cellular function that leads to the healing of bone defects. Results vary somewhat between materials and also depend on their state of division and/or porosity of the material as applied.

Hydroxyapatite, both natural and artificial, has been used extensively in various clinical fields where bone augmentation and regeneration are required (Shue et al., 2012). It has a similar composition and structure to the natural hydroxyapatite found in bones (Wang et al., 2007) and is known to bond directly to bone on implantation (Bagambisa et al., 1993). Despite its widespread use, applications of hydroxyapatite are limited because its surface properties are variable and this leads to inconsistent reactions by cells (Deligianni et al., 2001). This, in turn, can lead to only limited bone regeneration (Shue et al., 2012).