of a similar implant including a surface modification that improves the implant fixation is higher, because better mechanical endurance in the bone/prosthesis interface is more appropriate for the specific application.

The main goal of biocompatible materials in regenerative medicine is that of reconstructing any tissue or organ in situ from scratch. The optimal joint replacement would temporarily replace the joint functionality and in time degrade while being replaced by new healthy bone tissue formed by the host.

Synthetic bone grafts are developed to overcome the intrinsic limitations of using autograft (tissue taken from the host to be used elsewhere in the body) and allograft (tissue taken from one person and planted into another). Biomaterials are designed to provide temporary support for bone regrowth and reconstruction during tissue development. In addition, scaffolds can also be used as carriers for delivering therapeutic agents and growth factors (Harris, 2014). Selection of the scaffold material very much depends on the final application of the matrix, whether for structural support, carrying drugs, or both. Choice of material category for a scaffold includes: polymers, ceramics, and composites of the two; however, some materials are more suited than others for the final structure.

5.2 TYPES OF BIOMATERIALS

5.2.1 Polymers

Polymers are either natural or artificial in nature. Natural perishable chemical compounds reminiscent of type-I scleroprotein, chitosan, fibrin, and mucopolysaccharide can exhibit substantial biocompatibility, although the utilization of those materials is proscribed because of their considerably low mechanical stability. Perishable artificial polymers, such as polyphosphazenes, polylactide, polyglycolide, polyanhydrides, plastic fumarate, polycaprolactones, and associated copolymers (polylactide-co-glycolide), are widely used as scaffolds in tissue engineering (Duncan and Vicent, 2013). Polymers like polylactide-coglycolide and polycaprolactone are bulk degrading polymers and hence are less suited for drug delivery applications than area unit surface-eroding polymers, reminiscent of polyanhydrides, that can predictably deliver loaded factors and therapeutic substances (Sanchis et al., 2010; Duro-Castano et al., 2014).

5.2.2 Ceramics

A ceramic is a material composed of inorganic, nonmetallic material, which may have a crystalline structure. Ceramics usually have a high compressive strength and low malleability with high resistance to deformation. However, they have a tendency to fail as a result of their brittle nature. Typically, the compressive modulus of such ceramics exceeds the limit ordinarily seen in inner spongy bone known as trabecular bone. Calcium phosphates and bioactive glasses are often used as matrices for bone regeneration. These substances, particularly based on calcium phosphates, are ideal candidates to be used as