Chapter 9

The Use of Bioactive Glasses in Periodontology

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9.1 INTRODUCTION

Periodontology is the branch of dentistry that is concerned with the supporting structures of the teeth. As such, it focuses on maintaining these structures in good health and free from disease and damage (Lindhe, 1983).

Teeth in humans are supported by a complex biological structure known as the periodontium. This structure is embedded in alveolar bone of either the maxilla or the mandible, and it includes a layer of cementum and the periodontal ligament. The latter has some flexibility and also toughness, and these features allow it to cushion the teeth to an extent, so that they are able to perform their biological functions. These are typically those of biting, tearing, and chewing. Covering the alveolar bone is the gingiva (gums), a soft tissue well supplied with blood vessels and which, in healthy patients, is pink in color.

The structure of the periodontium is susceptible to attack by bacteria and this leads to the occurrence of specific periodontal diseases. These are gingivitis (early stage disease) and periodontitis (later stage disease) (see Table 9.1). The latter is especially damaging, since it results in destruction of the alveolar bone that supports the teeth. When this occurs, the teeth become loose and are eventually lost completely. In this way, periodontitis is the leading cause of tooth loss in adults throughout the world.

The early stage disease, gingivitis, is the result of attack on the soft supporting tissue by bacteria naturally present in the mouth (Lindhe, 1983; Fermin and Carranza, 1996). These include *Porphyromonas gingivalis*, *Tannerella forsythia,* and *Treponema denticola*. Attack by these organisms causes the gums to become inflamed and red in color. In this condition, they bleed readily. This condition represents only a mild infection, and it can be reversed by improved oral hygiene, specifically brushing the teeth and gums at least twice a day and cleaning between the teeth with dental floss. Additional regular cleaning by a

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