CHAPTER VI

CONCLUSION

This study was divided into two parts. These were 1) to determine the composition and quantities of tested elements in corrosion products released from orthodontic magnets and commercial magnets and 2) to investigate the biological effect of these corrosion products on the viability and growth of the cultured human gingival fibroblasts for 3 and 7 days.

In summary, this investigation could be concluded as follows:

Part I: The composition and quantities of corrosion products released from orthodontic magnets and commercial magnets

I.1) The quantities of six tested elements (boron, cobalt, copper, iron, nickel, and silicon) in corrosion products were analyzed by Atomic Absorption Spectrophotometry. Both orthodontic magnets and commercial magnets were more corroded in 0.9% NaCl and artificial saliva than in cell culture medium. The 0.9% NaCl was more reactive because of its high chloride content. Among six tested elements, there were boron released in highest quantity, and silicon was released in the second highest quantity. The released iron, nickel, cobalt, and copper ions were trace.

I.2) The corrosion products released from the commercial magnets were usually greater than those from the orthodontic magnets. This was because the commercial magnets were not coated, whereas the orthodontic magnets were coated.

Part II: Biocompatibility test of corrosion products released from orthodontic magnets and commercial magnets

II.1) The viability of the cultured human gingival fibroblasts in the presence and absence of corrosion products released from both magnets for 3 and 7 days was not significantly different.

II.2) The growth (new DNA synthesis) of the cultured human gingival fibroblasts in the presence and absence of corrosion products released from both magnets was not significantly different. However, the growth of the cultured human gingival fibroblasts for 7 days was significantly less than that for 3 days. There are three reasons to explain this result, including increased metabolic waste products or depletion of nutrients in culture medium, density-dependent inhibition, and cellular aging process.

II.3) Although the corrosion products released from the commercial magnets were not effect on the viability and growth of the cultured human gingival fibroblasts, corrosion resistance of these magnets should be considerably improved by coating the magnets with material. This will be beneficial for clinical application of the magnets because the magnet coating can reduce the corrosion.